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"And please return it. You may think this a strange request, but I find that although many of my friends are poor arithmeticians, they are nearly all good book-keepers." *Scott.*

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FIVE
DISSERTATIONS
ON
FEVER.

Medicina igitur adhuc taliter comparata est, ut fuerit magis ostenta, quam elaborata: etiam magis elaborata quam amplificata.—*Bacon*, *Aug. Sc. Lib.* ii. *Ch.* i.

Solent autem homines naturam tanquam ex præalta turri et e longe despicere, et circa generalia nimium occupari; quando si decendere placuerit et ad particularia accedere, resque ipsas attentius et diligentius inspicere, magis vera et utilis fieret comprehensio.—*Ibid.*

BY GEORGE FORDYCE, M.D. F.R.S.

FELLOW OF THE ROYAL COLLEGE OF PHYSICIANS, SENIOR PHYSICIAN TO ST. THOMAS'S HOSPITAL, AND READER ON THE PRACTICE OF PHYSIC IN LONDON.

SECOND AMERICAN EDITION:
FROM THE LATEST ENGLISH EDITION OF EACH RESPECTIVE DISSERTATION.

BOSTON:
PUBLISHED BY T. BEDLINGTON AND C. EWER.
1823.

Goodale, Glazier & Co.—*Printers*—*Hallowell.*

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FOR THE AMERICAN EDITION.

A FRIEND who was desired to superintend the reprinting of these Dissertations, conceived the original to be in such a state, that a perfect fac-simile would either bring censure on the author, or on those concerned in the present undertaking; for to what other quarter could the technical errors and defects contained in them be attributed?

The author also, who was for many years a public lecturer, and who was a man of peculiar character, dictated these several Dissertations to an amanuenis; publishing them successively at distant intervals, and leaving the final correction of each to the moment of revising them as they were printed. A work thus begun and conducted, is likely to have been deficient not only in polish, but in clearness and in accuracy of expression, and sometimes also in arrangement; to say nothing of brevity. So it has happened in the present instance; and therefore in an age, when perspicuity and correctness are usually sought for and attained, it seemed advisable that the author's present performance should undergo some modification. It was especially wished to render every important particular, in each sentence and in each paragraph, immediately obvious to the medical student when reading it in the course of his education, as well as to the physician when consulting it in the course of his practice. Nor is it to be overlooked, that the author himself has admitted in his fifth Dissertation, that the British public had long since objected to his manner of writing; and the English editor of that Dissertation (which was a posthumous publication) not only found it advisable in some respects to correct it pursuant to the author's wishes; but had been engaged by the author (while living) to revise three of the Dissertations which preceded it. Had that gentleman been more courageous, the liberties now taken might have been spared.—In the mean time, as the original published in England, still exists for those who may seek to refer to it, the changes now introduced are far less objectionable, than if they had been made in an original manuscript, which was thenceforth never more to see the light.

The control however thus assumed over the dead has been employed conscientiously; no alteration having here been made, which it is suspected that the author if living, would have disapproved as to the essence of it, had he seen it in the work of a stranger.—In some degree indeed the reader can judge for himself how far the objects here proposed have been secured; since it has been designed to banish from the text its principal ambiguities and intricacies, and some small portion of its prolixity; and so to arrange the materials by the division into paragraphs, as to exhibit a clear view of the author's general plans.—As to the case of paragraphs in particular; it is conjectured that the present American edition upon an average uses only one paragraph, where the English edition employs two or three; and in some instances, the disproportion is as one to eight or ten. In two cases, above half a dozen of the English paragraphs are here thrown into a single sentence. On the other hand, one paragraph of the original is sometimes subdivided in the American edition into two or more.—In particulars like these it is repeated, that the reader can judge for himself, as to the success of the methods employed for perfecting the present edition.

The forcible punctuation employed in this edition will doubtless displease many; but if after a little familiarity with it, the sense of the author becomes thereby readily manifest in all its parts, it ought to be acceptable to professional gentlemen (whose convenience it was held so important to consult;) unless they choose to condemn the ladder after it has served them in entering the building.—The spelling has in general been rendered uniform: but the author has often been left in possession of his peculiarities in grammar and in phraseology, as having nothing to do with the scheme of making his language simple and intelligible.—It is wished that the author could have been entirely stripped of his repetitions; but this would have been a difficult reform; and therefore, though a few of these repetitions have been suppressed, yet in most instances they have merely been thrown into a parenthesis.—The parenthesis has also been frequently introduced to denote subordinate matter, or to guide the eye in discovering the sense where it was intricate or where the sentence was long.—Some alterations lastly have been made merely to suit the convenience of the printer, in the correction of his proof sheets; and it should be added, that various sheets of this edition have not received the full benefit of the plan which was intended to be pursued in it, especially in its commencement.

The author's *meaning* in essentials, has never been intentionally varied from, in the slightest particular. A hint has now and then been offered in the notes (only one or two of which it must be observed belong to the author;) but it was solely for explanatory purposes in favor of the student, or with a view to suggest some trifles which were too minute for the notice of other critics.

For the rest, it is reserved as a natural right to the original patrons of the American edition of these Dissertations, to speak in a preface of their merits, their errors, and their omissions, without the slightest interference.

September, 1815.

P. S. No preface has been received, as was once expected.

ADVERTISEMENT

TO THE SECOND AMERICAN EDITION.

The same principles which were adopted in preparing the First American Edition of this work for the press, have been still more extensively employed in preparing the Second of these Editions; and it is hoped with an increased good effect, as regards the exhibition of the Author's *Plans and Opinions,* which may now be said to carry with them their own Analysis.

The reader on the other hand, will seldom find himself troubled with remarks on the *substance* of the work itself;—even when the author attempts to apply his treatment of "Fever" in England, to the "yellow fever" of the U. States!—The author indeed should have borne in mind on this occasion, that he had himself censured Boerhaave for *prescribing for diseases which he had never seen.*

That the American student and practitioner may nevertheless have every aid in treating *Intermittent and Remittent* Fevers, (which constitute the principal object of attention *in the larger portion of the U. S.;*) two important European works on these subjects, which have appeared in this country under the patronage of Dr. Rush, are now to be pressed upon their notice.—The *first* is a treatise by *M. Senac;* the principal physician to Louis XV, and the author of a celebrated book on the Heart. This treatise has for its title, "The 'Hidden Nature and the Treatment of Intermittent and Remittent 'Fevers;" and was translated at the request of Dr. Rush by Dr. Charles Caldwell; having been published at Philadelphia in 1805. The Second European work referred to, is, *Dr. Cleghorn's* "Obser'vations on the 'Epidemic Diseases of Minorca from 1744 to 1749;" which were republished by Dr. Rush himself, with *notes*, in 1809.—Both are short, but highly important productions.—Of the *first,* Dr. Rush remarks in an advertisement which is prefixed to it, that he had long known it to be a judicious and useful work; and had derived much assistance from it in his practice; and that it was peculiarly calculated to assist the students in medicine in the U. S. in forming just opinions of the nature and treatment of the *Summer* and *Autumnal* Diseases of their country.—Of the *second* publication, (that of Cleghorn) Dr. Rush observed, that it had passed through many editions; that it contained a greater mass of practical knowledge in a small compass, than any book perhaps of the same kind in medicine; that its merit consisted chiefly in the number and importance of its facts; (for facts afforded the surest passport of a medical book to present and future generations;) that the author of it viewed diseases in connection with climate, season, *aliments, drinks, and national manners;* and that as he took notes of all cases, as they occurred to him, he was enabled to compose and to publish the work in question, before he had entered the thirty-fourth year of his age.—Dr. Cleghorn, we add, was during five years a confidential house-pupil of the elder Monro, and attended the lectures of Mr. John Hunter in London; he was also a fellow student of

Drs. Fothergill and Russel; and one of the founders of the Royal Medical Society of Edinburgh: He rose also to high honors in Dublin, and was in much esteem at Paris. He says of himself, 'I have 'given the history of these fevers collected from an almost infinite 'number of cases, carefully minuted in the chambers of the sick; 'without trusting to memory, or regarding what others had said on 'the subject before me, or advancing any thing but from reiterated 'examination. The observations relating to the *Cure* (which are by 'much the most material,) have been confirmed again and again by 'the experience of all who have practised physic with attention, 'among either the English or Spanish inhabitants of Minorca.'

It is to be lamented, that Dr. Rush, (whose claim to be called a very eminent man is to be held as established,) has thus republished, with his notes, only Cleghorn, Sydenham, Pringle, and Hillary (of Barbadoes).—There are still various European Medical authors of the same periods, whose works merit a revival; and comments upon them by able American practitioners would add to the usefulness of them in both hemispheres. Where the habit of authorship is established, many examples prove, that undertakings of this kind may be pursued by men of the most extensive engagements, with little sacrifice of time. Nor is the occupation of an Editor to be considered as derogating from rank, whether as regards station or talent; especially where public utility is interested.—For example, we may refer to the attention which Senac bestowed upon Heister, Van Swieten on Boerhaave, Richerand on Boyer, Bichat on Desault, and Beclard and others on Bichat; or in another line, we may cite the notice paid by Voltaire and others to Newton, by Buffon to Dr. Stephen Hales, by Spallanzani to Bonnet, and by Dr. Hunter of York (Eng.) to Mr. Evelyn. Even in the case of poetry, we find Warburton as the editor of Pope, Mason of Gray, and the celebrated Mr. Fox as the intended, and Sir Walter Scott as the actual, editor of Dryden.

But returning to the work before us, we repeat the regret expressed in the advertisement to its first American edition; namely, that it was not revised and illustrated by those who were competent to the task, *and who were expected to have undertaken it.* But let us nevertheless add, that these *Five Dissertations on Fever,* naked and unprotected as they have been, have still attracted notice and respect; that the defects in them have been forgiven; and that no physiologist or physician, HOWEVER ABLE, is ever likely to read them with proper attention, without being led into new and important reflections.—We may say farther; namely, that since the days of good philosophy (of which Dr. Cullen saw at least the dawn) we have had an assemblage of writers in the English language on the subject of *Fever*; such as Darwin, Clutterbuck, Beddoes, Rush, Wilson Philip, Robert Jackson, Armstrong, Mason Good, and others; and yet none probably will deny a distinguished place among them to our author on account of his *Dissertations;* coming as they do from an experienced, original, contemplative, and successful *Practitioner.*

July, 1823.

THE

FIRST DISSERTATION

ON

FEVER;

CONTAINING AN ACCOUNT OF

SIMPLE FEVER;

OR OF

FEVER

CONSISTING OF

ONE PAROXYSM ONLY.

FROM THE EDITION PRINTED IN LONDON, IN 1800.

ERRATA, &c.

Defects in this edition have multiplied from the want of a revision of the proof-sheets; as also from the original of the work having been mislaid, in consequence of the decease of the printer of the First American Edition. The first portion of the present edition has likewise been noticed less strictly by the Editor, than the sequel of it. Nevertheless none but important errata are noticed; the rest being left to the kindness of the reader.

page.	line.	
57.	12.	dele, at present.
201.	11.	dele, although.
222	2.	dele, appear.
224.		For the note found here substitute the following: * See a note at the end of the *first part* of the present Dissertation. p. 281.
225.	11.	read 1757. (This error is in the original.)
255.	5.	from the bottom; for, them; read, been.
295.		Add to the first note at the end, as follows: —Also Black's Lectures edited by Robison, Vol. 3.
297.		Let the top line make the bottom line.
312.	28.	read *Retching.* N. B. It has been somewhat difficult to develope the author's scheme of division in the Fifth Dissertation. But the following mistakes not belonging to the author require correction: viz.
380.	6.	Let the paragraph begin with this mark of division; viz: 2d.
397.	8.	For (F.) read, (E.)
428.		In the copies where the following lines are wanting, (as is the case in part of the impression of the work,) they must be inserted at the top of this page.

—But when it does not, it often increases the difficulty of respiration, or the affection of the head; so that the patient dies. It is nevertheless worth running the risk; since the disease, if left to itself, is much more frequently fatal.—This kind of irregularity in continued fever, is fortunately not very frequent; and many practitioners may not have noticed it.

FIRST DISSERTATION, &c.

GENERAL OBSERVATIONS.

Fever is a disease, the existence of which no man could have the least suspicion of, although he were acquainted with the structure of the body, the properties of its solids and fluids, the various operations which go on in it in health, the manner in which they take place, the powers which produce them, and the connection of the body with the mind; as far as these are known at this day to physiologists, anatomists, or those who have studied medicine itself, or any of the branches of knowledge conducive, or which have been thought conducive to it. Fever is therefore only to be known by observing it in the diseased bodies of men afflicted with this distemper.—Many are the authors who have described it, both ancient and modern. It might therefore be supposed that the history of fever should have been rendered very perfect by this time, since it is one of the most frequent diseases, and has been so in all ages, and in all countries; more especially as it is likewise one of the most fatal; and as it so occupies the whole system, as to absorb during its continuance all the faculties, both of the body and the mind, in a greater or less degree.

Every man, however, who has read the various descriptions of fever, which have been given by authors ancient or modern, of one country or of another, becomes immediately sensible, that neither its causes, rise, progress, nor termination, are thoroughly known, or perfectly described; and of this he will be more fully persuaded, if he has frequently had occasion to see the disease.

The history of fever, therefore, is by no means thoroughly understood.—That its treatment is not understood thoroughly appears clearly, as the practitioners of different countries, who attend patients in this disease, nay of the same country, district, and even town, although men of great learning in medicine, employ very different modes of cure.

This subject, consequently, is not exhausted. Many physicians have labored, if I may use the metaphor, in the geography and culture of this country. But the geography is far from being completely delineated, the culture is far from being brought to perfection. The author of this treatise can only measure a few bases, carry on a few triangles, examine perhaps the soil of a few fields, cultivate some yards on the surface, or bring out a small part of those treasures which lie deeper. Many and many new observers, many and many new laborers must be employed to bring the whole knowledge and cultivation of it to perfection.

Since, as has been already said, nothing but the observation of the appearances which take place in persons afflicted with fever, nothing but seeing the effects of medical instruments employed in the disease, can give mankind any idea, either of its history, or treatment; nothing can give any man a power of improving the knowledge of this disease, either as to its history, or cure, excepting having seen it frequently; and one not acquainted with the previous knowledge of it, which exists in the world, cannot tell whether he has made any improvement or no. What has gone before, as far as has been related, is open to every man who will take the pains to read, and give attention to what is written on the disease.

It is natural for a reader to inquire, what opportunities of observation a man has had who pretends to make some improvement, that he may not waste his time in perusing what may contain nothing but dreams. Therefore, it is not impertinent to say, that besides all other opportunities of observing this disease, the author has been for upwards of twenty years one of the three physicians of St. Thomas's Hospital, whose walls have contained nearly four thousand patients every year ; and where the proportion of fevers to other diseases is much greater than the general proportion ; since fevers, and indeed all acute diseases give a preference in the admission of a patient, and many fevers originate in this, as well as in all other hospitals. His attention also has been particularly drawn to this, and other diseases, by describing them, and pointing out the manner of their treatment to students in medicine, three times a year, for thirty years. He hopes, therefore, that it may not be thought improper in him to try to contribute his mite to forward the power of medicine, by endeavoring to distinguish this disease, and assist in extricating mankind from its painful and fatal effects.

Fever has obtained its name, in Greek, Latin, Arabic and Persian, principally from the idea of heat; *pur*, in Greek, fire; *febris*, in Latin, from *fervere*, to burn, &c.

In the language of this country, the vulgar, if they are hot, say that they are in a fever. The intolerable sensation of heat, which is often expressed by patients afflicted with this disease, the author not only knows by the complaints of his patients, but he has felt the excruciating effects of it himself.

It has been an idea which many practitioners in the art of healing have cherished, that in every disease there is some appearance, which being present, the disease is present; being absent, the disease is absent. It affords indeed so flattering a prospect, and would render a knowledge of the disease so perfectly easy, that practitioners in medicine, have constantly been extremely apt to give way to the delusion. It is as if, whenever a sailor approached an island, where there were chalk cliffs, he should immediately conclude them to be the snowy cliffs of Albion, and the island therefore of Great Britain; or, on the contrary, if he fell in with the Columns of Staffa, that he had fallen in with the Giant's Causeway of Ierne. There are few appearances (symptom is the Greek term for appearance) that never take place excepting in one particular disease; and still fewer particular diseases which do not often take place without any one peculiar symptom. An inflammation, (to give a strong instance, but perfectly grounded on anatomical dissection,) may take place in the pleura without pain; since not only adhesions have been found on dissection, but suppuration both above and below the pleura, when the patient has never complained of any pain in the side.

Fever, of all diseases, is that one in which a pathognomic symptom is least to be depended upon; (that is to say, an appearance which does not take place when there is no fever, which always does take place when there is fever.)

Let us examine those appearances which have been considered as pathognomic.

Heat, that symptom which I have shown as preponderating in the ideas of all those nations whose medical knowledge we are acquainted with, certainly is not a pathognomic symptom of fever.

Until the time of Van Helmont, there were no means of measuring what many Chemists call at present the apparent heat of the body. He first invented a measure of heat by air contained in a glass globe, pushing up when heated a fluid through a small cylinder, and allowing when cold the fluid to descend in the same cylinder. By this means, he measured the degree of heat by the expansion and contraction of bodies. This instrument has been since much improved; so that by the difference between the expansions of glass and mercury, as well as between those of other solids, fluids, and vapors, we can measure very exactly what has been called the apparent heat of bodies.—By the application of this instrument to the bodies of patients afflicted with fever, the author has often found the heat less than that which is found in the bodies of men in perfect health, although all the other appearances which constituted fever were present; such as foulness of the tongue, dryness of the skin, frequency of the pulse, delirium, and the patient feeling himself very hot. That is to say, the heat of the human body being measured by a very small thermometer, putting the ball, (only the fourth part of an inch in diameter, with a cylindric stem proportionably small,) under the tongue, the mouth being kept shut for four or five minutes, and the respiration carried on through the nostrils; under these circumstances, the thermometer has been at 96°, 95°, or even 94°, in some cases. On the other hand, when a patient has felt himself very cold, this measure of heat, applied in the same manner, has shown that the apparent heat of the body was 104° or 105°.—This kind of measure of heat being totally unknown till the time of Van Helmont, and not being brought to any kind of perfection till long after his time, we cannot ground any reasoning upon it that can be at all connected with the ideas of Greece, or with any description of the feelings of mankind with regard to heat in fevers, where this instrument was not known or has not been employed.

The author brings next into consideration the feel of the patient, with regard to heat and cold. Although his feel of heat is more frequent and of greatly longer continuance than his feel of cold in any fever, which is not fatal in a few hours; yet he undoubtedly feels himself frequently excessively cold; very often, at the beginning of the first attack of fever; often at the beginnings of the attacks when fevers have intermissions; not frequently, but not very uncommonly, in the middle of fevers, in which the patient, during the course of the disease, is never free from fever.

Another person, applying his hand to the body of a person afflicted with fever, feels a part of the body hot sometimes, when the patient himself feels it cold: sometimes it may be felt to change from hot to cold in almost an instant, or from cold to hot in the same period of time: and this by no means consonant, either to the feel of the person afflicted or to the thermometer.

Heat, therefore, considering it in any way that it can be measured, cannot be taken as a pathognomic symptom of fever; (that is, an appearance which always takes place when a fever is present, and is always absent when a fever is absent.)

It will hardly be thought necessary here to consider heat in the body, which is not shown by any of those measures which I have pointed out; and which has lately been conceived to exist in matter, without being sensible, by producing expansion of solids, fluids or vapors; or sensible to the feelings of mankind or other animals.

Some authors and practitioners have conceived, that cold followed by heat constituted a fever; but every man who has been conversant with this disease, and has attended to its attacks, knows perfectly that it often begins without any cold, measured either by the thermometer, the sensation of the patient, or feel of a by-stander.

A less degree of heat measured by the thermometer, the feel of the patient, or of a by-stander, we call cold. In some cases of fever the author has measured the temperature, at the first approach of an attack, in all these ways, and very frequently throughout the disease; without ever finding a greater degree of cold than the ordinary heat of the body, from the first beginning, till the end of the disease. This will be undoubtedly confirmed by the observation of practitioners and relations of authors.

On the other hand, cold, considered in the sense the author has explained, has frequently taken place, according to all the above measures, in diseases, which no practitioner has every considered as fever; in hysteric affection for instance. Cold therefore cannot be deemed a pathognomic symptom of fever.

Frequency of the pulse has been more generally considered as a pathognomic symptom of fever. The pulse, (that is to say, the contraction and relaxation of the arteries, which is readily felt in any artery lying near the skin, especially if it be only covered by the skin,) enumerates almost always the number of contractions of the left ventricle of the heart. In persons in health, indeed in animals in general in health, the number of contractions of the left ventricle of the heart is wonderfully uniform. In mankind, at an adult age it is most commonly 73 strokes in a minute, so that it might be almost taken as a measure of time. In men hurried with the business of large towns, it varies a little, though very little; in perfect health, the number of contractions is rarely found to be less than 70, or more than 75 in a minute. We find, but not commonly, idiosyncracies, (that is, dispositions in particular persons,) where the contractions of the ventricle are fewer, others where there are more than 73 contractions in a minute; but in such persons, whatever be the number of contractions in a given time, it remains uniform; that is to say, if the number of contractions of the ventricle be 60, then it is always 60 in health; if it be 80, then it is always 80 in health. It is very rare to find in such idiosyncracies the number less than 70, or more than 75; and these idiosyncracies are very uncommon, one not happening in an hundred times; or if we take those in which the number is more than 80, or less than 60, not one in a thousand.—The contractions in children are more numerous, and more easily disturbed; in old men not uncommonly less. I felt the pulse of an old man in the Charter House, whose natural number did not exceed 26 contractions in a minute. The number of contractions in old persons is also less regular. In the present inquiry, we may lay aside what happens in children and in old men, and consider the ordinary number of contractions to be 73 in a minute.

When therefore frequency of the pulse is taken as a pathognomic symptom of fever, it is meant, that the pulsations of the arteries, that is the contractions of the left ventricle of the heart, are more than 73 in number in a minute. But it is by no means agreed by authors or practitioners, that any particular increase above 73 in a minute is fever.

It has therefore been a question, what the increase is that constitutes the pathognomic symptom of fever. Some have taken 90 pulsations in a minute, or any greater number, as the number which constitute fever. Fever, therefore, according to their sentiments, is always present, when the number of pulsations in a person whose ordinary number is 73 in a minute, becomes 90 or more in the same time. This has induced many to call all diseases fever, in which the pulsation of the arteries arises to 90 strokes or more in a minute.—Every man may employ any term, in any sense he chooses, provided he defines it. Suppose therefore we admit all diseases, in which the number of pulsations are above 90 in a minute, to be fevers, let the author examine what diseases must be included under this name.

Supposing that there is a spasmodic contraction of the intestines, it frequently happens, that the pulsations become more than a 100 in a minute; then this man must be said to be afflicted with fever. If we exhibit to this man a dose of spices, the contraction of the intestines is carried off, and the pulse soon returns to its ordinary state. If a person goes down a dance, with more than ordinary velocity, the pulsations are frequently more than a 100 in a minute, and therefore this person is afflicted with fever. If a woman should suddenly meet the object of her love, her pulsations are often 100 in a minute, she then likewise is afflicted with fever.—But these, and an hundred other cases which might easily be brought, are very far from the disease which I am about to describe; very far from the fevers of all the great practitioners of Greece, Arabia, or even of the majority in modern times.

Frequency of the contractions of the left ventricle of the heart may be present without fever; on the other hand, fever may be present without more numerous contractions of the ventricle of the heart than those which take place in health.—The author has seen in many instances a fever take place, and go on as a continued fever, so that in the middle of the second week, the pulse has been frequently from 100 to 110, or even more; the tongue covered with a brown fur, and dry; the skin dry; there has been great depression of strength, costiveness, violent pain in the forehead, delirium, strong evening exacerbations, with stupidity of the eyes;—in such cases the author has known the pulsations become as few as 60, 50 or even 45 in a minute, all the other appearances of the disease remaining the same, (that is to say, as they are above described,) or the fever even increasing in all other respects.—This small number of pulsations after continuing for two or three days, has given place to a number of pulsations as great as before; so that if a man had attended to the other circumstances of the disease, and not felt the pulse, he would have had no reason to suspect that the pulsations had been fewer during that time. This the author has frequently shewn to the pupils attending St. Thomas's Hospital, as it was shown to him by Dr. Cullen, Sir John Pringle, &c. &c.: It has been observed by many practitioners, and mentioned by some authors.—We certainly should not in this case affirm, that during this time a patient is free from a fever:—therefore a fever may be present, and that in a great and even fatal degree, without an increase of the number of pulsations of the arteries, that is, contractions of the left ventricle of the heart.

The increased number of the pulsations of the arteries above what takes place in health, is therefore not a pathognomic symptom of fever; since they may be more numerous without a fever being present, and less numerous than they are ordinarily even in the worst case of fever.

If we examine the restlessness, anxiety, state of the tongue, head-ach, or any other of the symptoms which often take place in fever, we shall find that they also may be present when there is no fever, and absent in a patient afflicted with this disease;—and therefore we cannot allow that there is any pathognomic symptom of fever.

Many diseases have been called fever, even by practitioners of great knowledge and observation, which the author does not mean to include in the number of fevers.—In the first place, he excludes all affections of the system which depend upon any other disease. Thus in phlegmonous inflammations, in pleurisy, for instance, there is often frequency, greater strength and hardness of the pulse; foulness of the tongue; loss of appetite; and want of sleep. If the inflammation be carried off, all these appearances subside of themselves, they only depending upon the inflammation of the pleura; and therefore are, according to this rule, not to be considered as fever.—So in inflammation of the intestines there is frequency of the pulse, with contraction, hardness, and often obstruction, pain in the forehead, dryness, and dusky color of the skin: the tongue is covered with a brown fur; there is great depression of muscular strength, convulsive contractions in the extremities, nausea and vomiting, costiveness, &c. If the inflammation of the intestines is removed, these appearances all go off, they depending entirely upon the inflammation of the intestines; and, therefore according to this rule, cannot be considered as fever.—In erysipelatous inflammation, (that is, inflammation of the skin,(all the last enumerated symptoms may arise. This inflammation may be cured by the application of alcohol diluted with water; and as all the symptoms affecting the other parts of the system then disappear, they cannot be considered as fever.—The same symptoms may arise in dysentery; but if the intestines are restored to their ordinary state, they go off; and therefore cannot be considered as fever.—In gangrene and mortification, similar symptoms may arise, and continue, notwithstanding that the dead part is cut off: still they cannot be included in fever, because the wound has a tendency to gangrene and mortify; and does actually in a great proportion of cases gangrene and mortify. It is this disposition to gangrene and mortification which keeps up these appearances; and therefore they depend upon another disease, and are not to be included in fever; for fever does not give a wound a tendency to gangrene and mortify. If these appearances then constituted a fever, they would not give a wound a tendency to gangrene and mortify. If a phlegmonous inflammation arises in the parts surrounding the dead part, when it is not cut off; these symptoms do not appear at all, or if they have taken place they subside. So in like manner, if the dead part be amputated, and the wound has a disposition to good suppuration, (which it has sometimes, although rarely,) then the appearances, which I have last enumerated, go off if they have taken place; or if they had not taken place before, they do not arise.—So in rheumatism, afflicting a particular part of the body or taking place in various parts by metastasis, it happens frequently that the pulse becomes hard, full, strong, and frequent; the tongue is covered with a white crust, there is loss of appetite, great increase of all the symptoms in the evening, and great relaxation, in the morning; but these all depend upon the rheumatism affecting particular parts of the body: and if all the topical affections should be carried off, then those appearances which have been enumerated likewise subside; and are not therefore, according to the rule laid down, a fever.—So in tetanus, there is frequency together with obstruction of the pulse, head-ache, loss of appetite, nausea, not uncommonly want of sleep, and delirium; but these symptoms depending on the spasmodic contraction, or disposition to spasmodic contraction in different muscles of the body, do not constitute a fever.—There are many other diseases which might be enumerated that produce affections of the system, generally depending upon the continuance of the disease that gave occasion to them: none of these are for the same reason to be called fever.

When a disease of a part of the body produces an affection of the whole system, in which there are many appearances similar to those which take place in fever; if upon removing such disease the affection of the system does not immediately go off, but begins to subside, and continues gradually to subside; such affection, for the same reason cannot be called fever.

The next rule is, that a disease which affects a part of the body only, (that is, any particular member of the body, such as an arm, the head, stomach, &c.) and does not affect the other parts of the system; or which produces affection of other parts of the system, depending only on the affection of that part; cannot be called fever.

Practitioners not well versant in this disease, have frequently supposed themselves sagacious in discovering such diseases to be fevers. Thus an hemicrania, taking place by paroxysms; which sometimes begin with coldness, and produce frequency of the pulse, foulness of the tongue, loss of appetite, and heat, and which observe sometimes a quotidian, tertian, or quartan type; has been conceived to be and has been called a fever, of which it has nothing of the essence, which is to be afterward treated of.

It is not to be concluded from what has been said, that a fever cannot exist long with any other disease.—A fever may begin first, continue for some time, and another disease may arise afterwards without carrying off the fever, but may continue along with it. The second disease may go off without carrying off the fever; and being carried off, all the symptoms of fever may still remain, and it may go through its course.---This seems to be a case which has been with difficulty understood by practitioners. For example, a man shall be seized with a coldness, anxiety, depression of strength; the coldness may be followed by heat; frequency of the pulse, head-ache, foulness of the tongue, and other febrile symptoms take place; then there shall arise after some hours, or even after some days, pain in the side, (increased on inspiration, and constant,) with cough, difficulty of breathing, hardness, fulness and strength of the pulse, and all the other symptoms of pleurisy. The pain in the side, and all the pleuritic symptoms may be removed by bleeding, and other remedies; yet, (after there is no longer any pain in the side,) the pain in the forehead, the foulness of the tongue, depression of strength, and all the febrile symptoms may continue; and the disease may go through the remaining part of its progress just as if no pleurisy had arisen in it.

Such cases are rendered more difficult, in as much as it happens, not uncommonly, that another disease arising in fever cures the fever; and that all the appearances which continue afterwards are entirely produced, or kept up by this second disease, the fever having entirely left the body. Thus, if a person should be attacked with coldness followed by heat, frequency of the pulse, pain in the forehead, great depression of muscular strength, and the other symptoms of fever; in two or three hours an inflammation of the intestines may arise, and cure the fever.—Although the fever however is carried off, the head-ach and foulness of tongue continue: the pulse becomes more frequent, as well as small and contracted. These appearances although they may be the same with those which took place in the fever, yet depend upon the inflammation of the intestines alone. If the inflammation of the intestines be cured by general or topical bleedings, fomentations, and other remedies, which have no tendency to carry off the fever; all these appearances will gradually subside, and cease in a very short time after the inflammation of the intestines is cured.

It was thought necessary before entering into a description of fever, to consider these preliminary subjects.—The description of the disease is next to be entered upon,

OF THE DESCRIPTION OF *SIMPLE* FEVER, ITS CAUSES, AND COURSE OF OPERATION.

A fever is a disease which no knowledge of the structure of the human body, as far as it is at present known; no knowledge of the properties of the fluids, as far as they have hitherto been investigated; no knowledge of the action of the moving parts, as far as they have hitherto been observed; could give the smallest ground to suppose ever existed. In showing its history, therefore, observation of the disease is to be entirely adhered to, without any reasoning why, or how, any thing in it takes place; or without any theory, as it has [illegible]. It would be [illegible], at least for any useful purpose, [illegible] were not to describe a country, but reason very [illegible] in one region, a valley in the other; very [illegible] sandy; instead of actually giving the situation of the hills and valleys, the rockiness or sandiness of the surface.

A fever is a disease which affects the whole system: it affects the head, the trunk of the body, the extremities; it affects the circulation, the absorption, and nervous system; it affects the skin, muscular fibres, and the membranes: it affects the body and affects likewise the mind. It is therefore a disease of the whole system, in every state of fever. It does not however affect the various parts of the system uniformly and equally; but on the contrary, sometimes one part is much affected compared with the affection of another part. Sometimes those parts which were most affected at one time, are less affected at other times; so that the appearances which are the strongest marks at one time, are by much the slightest in another, or sometimes are totally absent. This has given great ambiguity to this disease.—To describe it, it is necessary to suppose a case in which all the appearances which ever take place as essential to the disease, are present in an equal degree, though no such case ever happened;—especially as the presence of one appearance does not in any degree imply the absence of another. For instance, in most fevers there is pain in the forehead: in some there is no pain in the forehead. In most fevers there is foulness of the tongue: in some the tongue is of healthy appearance. The presence or absence however of head-ach has no influence on the foulness of the tongue; and the presence or absence of the foulness of the tongue has no influence on the head-ach. There may be great head-ach and great foulness of the tongue both together in the same patient; or there may be no great head-ach, and great foulness of the tongue in one patient; or there may be little foulness of the tongue and great head-ach in another patient; or there may be but little foulness of the tongue and little head-ach in another patient; or there may be head-ach with no foulness of the tongue in one patient; or there may be foulness of the tongue, and no head-ach in another patient; or there may be neither head-ach nor foulness of the tongue in another patient;—and so it may be of any other two symptoms whatever, which occur in this disease.

Fevers take up different times in their duration. Sometimes they go through the whole of their course in eight, ten, or twelve hours; so that the patient is seized with the disease, all the symptoms arise which constitute the essence of it, the hot fit takes place, the disease terminates; (or in other words, a variety of different appearances take place, the disease is entirely terminated, and health restored in this period of time.) This, therefore, must be considered as a complete fever, since every thing which is essential to fever happens in it.—If a man making a journey goes with the velocity of the wind, and another with that of a snail, the journey is equally performed, although in different times. The journey may consist of one stage, or of many stages; in the first instance, the journey will be completed in one stage as perfectly as it will be completed in the other, in the several stages. When a fever goes through its whole course in eight, ten, or twelve hours, it has completed its existence as perfectly as if it had taken eight or ten months. If it completes its course in one stage, it has completed it as perfectly as if it had gone through many similar, or even dissimilar stages.---This is clearly the idea of Sydenham, one of the very first authors for accurate observation, as well as of many other great authors and practitioners.

If a disease completes its course in a short time in some cases, and in others takes a longer time in completing its course, it is sometimes best to consider its history in the one case, and sometimes in the other.---If there is not time for the appearances to be observed distinctly, then undoubtedly we should take those cases where the course of the disease occupies a longer period of time.---If on the contrary, there is sufficient time for observing with great enough accuracy all the different appearances, it will then be better to take the disease which occupies a smaller period of time in its course; because it is less subject to be mixed with any other disorder, the appearances of which may be improperly taken for the appearances of the disease which is meant to be described.

A fever which goes through its course, and is completely terminated in eight, ten, or twelve hours, gives sufficient time to observe all the essential appearances which take place in the disease; and therefore it is to be first attended to.

A fever which terminates in less than twenty-four hours, terminates in less than a day and night, and therefore was called by the [illegible] Many [illegible] authors, such as Boerhaave, have [illegible] exercise, eating too [illegible] drinking too much [illegible] which terminated in less [illegible] these, like Boerhaave [illegible] practitioners [illegible] number of patients confined to [illegible] fevers in which [illegible] which terminated in [illegible] that the author now, [illegible] the varieties

[illegible] symptoms all at [illegible] diseased to a [illegible] a man sitting [illegible] instantly so much [illegible] a nurse.

[illegible] time of the twenty-four [illegible] fevers begin between [illegible] evening than take place be- [illegible] morning. There is a [illegible] according to the author's ob- [illegible] eight in the morn- [illegible] take place between eight [illegible]

[illegible] be given [illegible] It [illegible] difference of [illegible] the sick [illegible] remarkably [illegible] similar in [illegible] of [illegible]

[illegible] uneasiness [illegible] the patient [illegible] particular part [illegible] and to the same time. Perhaps in this case it is the mind which is first affected.—It is indeed a proposition risked with great doubt, that a disease should be in the mind, not in its moral sense; (those disorders which are found in the mind, connected with bodily disease, having been considered as *arising* from some derangement in the body.) This subject will be considered more fully afterwards, the author offering this opinion with the greatest diffidence.—Along with this uneasiness there is a restlessness; the patient wishing to change his place or posture frequently: the mind likewise cannot rest upon one object, but often wanders from one to another subject. At the same time there is a feel of weariness which resists the disposition in the patient to change his place and posture, and resists the disposition of the mind to alter the object of its attention; rendering the wish for such constant changes ineffectual. With these arises an *actual inability* of exerting the muscular powers, or performing any of the functions of the body; and also an actual inability of exercising the faculties of the mind, the powers of perception, memory, arrangement of ideas, and judgment, in the same degree as in health.—The degree in which these symptoms take place is extremely different in the attacks of different fevers; but these appearances are very rarely absent, although indeed they may also happen in other diseases.

This inability, which is common both to the body and mind, has been called weakness or debility. It appears to the author, that it ought rather to be called depression of strength, (as he believes it has been by some authors:) that is, it is not that the powers of the body are lost, but they are prevented from acting by the disease. If the powers of the body and mind were really taken away, then this inability of exerting them would remain after the disease was removed; but it does not remain; for if the disease ceases in eight, ten, or twelve hours in any of the ways hereafter described, the inability ceases likewise; and both the body and mind can exert themselves with a vigor nearly equal to what they could have done just before the disease began, or in perfect health. If such a weight were laid upon a spring moving a machine, as to overcome it without destroying its elasticity, that spring would be prevented, either altogether or in a certain degree, from keeping up the motions of the machine; but that unusual weight being removed, the spring would immediately be enabled to perform all its former functions the human body. Whether in such cases the attacks of fever are attended with greater degree of cold, as pointed out by the thermometer, we have no observation: but the author has very good evidence of the sensation of cold taking place on the attack of fever, even when the heat of the atmosphere, in the shade, is considerably above the healthy heat of the body: (which heat is very nearly uniform, not varying a degree of Fahrenheit's thermometer in *any* climate, when measured under the tongue, or by such means as can be employed to ascertain the heat in the interior parts of the body.)— The author therefore would presume that an attack of fever has the power of diminishing the heat, as far as can be judged of by a thermometer; (without its being dissipated to surrounding bodies, or diminished by any other means than by fever itself.)

We judge of cold by the feel: that is, by having a substance of a certain temperature of heat applied to the skin, or the mouth, or the stomach, or some other parts of the body. We feel a sensation of cold on touching the skin of a patient in the attack of fever.— This sensation often accords neither with the sensation of the patient, nor the degree of heat shown by the thermometer. This is an appearance so extremely unlikely in itself, that the author, when it was related to him, thought it quite impossible. It may be found in many authors, although not laid down with great precision; but frequent attention to the attacks of fevers has convinced him perfectly, that a part which the patient feels cold, feels hot to a by-stander; and the contrary.—But this is very far from being always the case: it happens often that the patient and the physician, when he has his hand upon the arm of his patient, shall agree with one another perfectly in their idea of coldness; and the thermometer shall sometimes agree, and sometimes disagree with them both.

In the attack of a *simple* fever, which is at present attempted to be described, the degree of coldness measured by the feel of the patient, the feel of the by-stander, or the thermometer, is extremely unequal in different parts of the body.—It is most equal to the patient himself; but that is common to the general sensations of mankind in health: for if a man should sit in a warm room, and there should be an hole in the door opposite to a particular part of his body, although the cold air be not applied to a circle of above two or three inches diameter on the surface of his body, he feels universally cold. To a thermometer, or a by-stander, the cold of different parts of the body frequently feels very unequal; and is very fluctuating.

With these symptoms, a *Diminution of Sensation* takes place. Sensation is partly an affection of the body, and partly of the mind. ---In the first place, it is necessary that some impression should be made on some part of the body, or at least that some mechanical affection should be produced; in order that an idea should be excited in the mind. As for example; the picture of an object must be painted upon the retina by the lenses of the eye, in order that the sensation of vision should take place. It is true, that a man sometimes may, and does conceive that he sees an object, (light for instance,) although no such object is painted on the retina; but this is memory, and not sensation; for no new idea of any visible object was ever acquired by such a sensation. It is well known, and the author believes universally allowed, that all new ideas arise in the human mind from the impressions made on the sensible parts, except such as arise from the consciousness of its own operations;—but an impression may be made on any sensible part without exciting any idea in the mind. A man, for example, sitting on the bench of a play-house, had no idea of the hardness of the bench when he saw Garrick in Lear bring the body of Cordelia upon the stage. The mind must be vacant to bend its attention to the impressions made upon the body, in order that ideas shall be excited by such impressions.—When we speak, therefore, of the sensibility of the system, we must be careful to discriminate between these two functions, viz. the impression made on the organ, and the sensation excited in the mind.

The first thing that is to be treated of is, how far the impressions made upon the body in fever, have their power of exciting ideas in the mind diminished.

In the first place, in some cases the impression upon the body must be much less, when an extremity is really much colder than in a healthy state. A substance likewise colder to the thermometer cannot produce the same impression of cold upon the skin of that extremity that it would have done, if the extremity had been warmer; for the sensation of cold depends upon the temperature which the skin has been accustomed to.

In the second place, the depression of the muscular power may [illegible] The muscles of [illegible] of the eye, adapt [illegible] so paint [illegible] but if the [illegible] cannot so [illegible] the pictures [illegible] the mind cannot [illegible]

[illegible] equally [illegible] at the time, but [illegible] and [illegible] That [illegible] the very [illegible] produced. [illegible] reasons [illegible] should not [illegible] but the [illegible] of [illegible]

[illegible] illustration of a well-[illegible] The [illegible] is not [illegible] the [illegible] application of [illegible] accustomed [illegible] the attack [illegible] deafness has [illegible] been ap-[illegible] in the [illegible] assumed, that [illegible] convex; yet [illegible] less distance must be formed upon the retina; but sometimes, at almost the beginning of the attack of a simple fever, no impression is made upon the mind from such picture.

The faculty, therefore, of receiving impressions in the mind is also hurt in fever.

But sensation is again to be taken in two other lights, to wit, as it is distinct or indistinct.

It is an ordinary fallacy that the mind is always capable of taking distinct impressions from the same picture made upon the eye, from the same vibrations of the fibrils of the ear, from the same impression of vapor or of steams on the nostrils, or of substances applied to the tongue or to the skin or the other sensible parts of the body. It requires an *exercise* of the mind to receive such ideas distinctly.—There can be no doubt but that a picture of an object may be painted equally on the eye of the rudest Indian, and the most polished of mankind; but it does not give the Indian the same distinct idea. But, (to avoid any thing that might be conceived to arise from refinement of the passions,) no one would contend that the Indian would be equally sensible of the difference of the flower of tormentil, and a tetradynamous plant of Linné, with a botanist.---In the attack of fever, this power of distinct sensation is diminished in all the organs of the senses.—This is one of those things which render it often difficult for a practitioner to get a clear and distinct account of what the patient actually feels. Perhaps this is a greater source of error in the description of fevers than any other.---Many practitioners have conceived it even useful to suggest feelings to patients which they had previously imagined they ought to feel in a disease. Many, with a laudable but mistaken view, have suggested to a patient feelings which the practitioner has supposed that the patient had, but had not attended to; while the patient assents to his having them, from his conception of the practitioner's superior skill in the disease: some few perhaps to make a show to the by-standers of their being able to feel for the patient, or to divine his feelings. This has rendered the conception of the disease very erroneous.

The diminution of the power of sensation in all these ways is very various in the attack of a simple fever; but this will be considered more fully afterwards.

At the beginning of the attack of a simple fever, sometimes at the very first symptom, a *Pain* arises in the small of the *Back:* it is rathvery first beginning of the disease, when it is noted at all; for the great sense of restlessness, uneasiness and anxiety, drown the perception of it in the patient in many cases where it is actually present; and render it exceedingly difficult to determine how far it is a constant or very common symptom.

The *Color of the Skin* changes often at the very beginning of the attack. The skin itself is colorless, or, in other words, white; the scarf skin is also colorless, but transparent. The blood flowing in the blood vessels is scarlet, that is a mixture of red and yellow; in the arteries the yellow is in greater proportion, but is more or less lost in the blood's passage through the capillary vessels into the veins; but when the circulation is going on, it retains a small portion of its yellow, even in the veins.—On the whole, therefore, a color is given to the exterior surface of the body, by the blood circulating in the small arteries, capillaries, and small veins, which verges from a pure red to a tint of yellow; so that the external surface of the body is what we call somewhat of a florid red, in as far as its color depends upon the blood circulating in the skin, or perhaps even somewhat under it.---Between the scarf skin and true skin, there are several membranes which are called together rete mucosum, of which there is one of a lighter or deeper brown; which is a mixture of red with a less proportion of yellow and blue, than constitutes white or grey. This mixture is not always the same in different men: sometimes it is such as to approach more to white, and sometimes to approach more to grey; and this governs what is commonly called the complexion in men.---Besides this membrane, there are numerous glands, which secrete a kind of oily matter of a dirty yellow; that is, a yellow somewhat contaminated by a mixture of red and blue.---In the attack of fever, the color of the *skin* itself is not altered; the transparency of the *scarf skin* is somewhat diminished; the color acquired from the *blood* is very much diminished; the color of the brown *membrane and the sebaceous matter* remain and predominate, and give a dirty look to the external surface which is very conspicuous.

At the same time another appearance takes place in the skin. By a common error in the human mind, it is apt to believe what first offers itself to it. It was long before it could be inculcated into rude nations that the earth was not the centre about which the whole of the heavenly bodies revolved. On considering the bodies of animals, and finding that the muscles, which are the principal agents in producing the motions of the body, consisted of fibres; it was supposed that a part, in order to be capable of contraction must consist of fibres. As no fibres therefore could be shown in the skin in the human body, it has been believed by many that the skin is perfectly inert, and incapable of contraction; while there is no man, (who is not blinded by his mind being pre-occupied by such prejudice,) who has not daily evidence, in looking at his own skin, of its being sometimes contracted, and applied to the muscles, and other parts under it, so as to press upon them with great tightness; and at other times of its being loose and easily moveable: sometimes smooth, soft, and equal; at other times, contracted in wrinkles.---In the attack of fever, it is contracted in wrinkles, and applied closely to the muscles and other parts below.

In describing the diminution of Sensibility, that of the particular parts has been left to be considered along with the other alterations which take place in them.

The sensibility of the *Skin* is very much diminished in the attack of a fever.---Of this one great instance is its insensibility to *heat;* which has been so great in some instances, that no sensation has been impressed on the mind, when hot bodies have been applied so as to coagulate the scarf skin, or even decompose the true skin, (as has been observed.)---This insensibility to heat is not from the sensation of coldness, which has been already described; for it extends to the sensations of the skin of every kind. It is a degree of what is called numbness; or indistinctness of the ideas which are obtained by the feel of the figures of bodies; of their smoothness or roughness, their hardness or softness, &c.---It is extended to other applications that give pain, as well as to heat; as to pricking with sharp instruments, the application of stimulating substances, &c.—The degree in which this numbness, or want of sensibility in the skin takes place, is various; but exists almost always more or less in the attack of a simple fever, and is among the *first* appearances in the disease.

The *eye* in its appearance is also very much changed.---Often at the very beginning of a simple fever, the *exterior* skin of the eye-lids is affected, in the same manner as the skin in the other parts of the body: The *interior* surface of the eye-lid is not readily exposed to view:---It is the exterior surface of the eye itself, and what can be seen through its transparent membranes; which the author means here to take notice of. The exterior surface consists of the tunica albuginea, and cornea; covered by the tunica conjunctiva, which is in itself very thin, perfectly transparent, and colorless.---The eye may be divided, (as in common language,) into the white and pupil of the eye.---In the white, the tunica albuginea is in itself of a white color with somewhat too great a mixture of blue. There run great numbers of blood vessels in it: many of these are visible to the eye; many others may be seen if we apply any magnifying apparatus to the living eye; and we know from anatomical inquiries, that there are vast numbers too minute to be discovered by any means in the living eye. These carry blood of a florid red color; which influences the general color of the white of the eye.---Besides these, there are a number of glands which secrete either mucous, or sebaceous matter. The sebaceous matter is of a dirty yellow color, like the color of bile; and by many, when predominant, has been considered as actually bile. Every thing in the body, however, which is of this particular yellow color, is not bile: the wax in the ear for instance, is not only of a yellow color, but bitter in taste; yet it is not bile, differing from it in most of its other properties essentially.---In the attack of a simple fever, there are fewer blood-vessels visible in the tunica albuginea to the naked eye. The florid red makes much less of the general color; and leaves the color more to be governed by the bluish white of the tunica albuginea, and brownish yellow of the sebaceous matter; so that the white part of the eye is more obscure or less brilliant than in health.---The *iris*, as seen through the cornea, in the attack of a simple fever, is sometimes more contracted, sometimes more dilated than it is in the healthy state of the body. It almost always is less susceptible of contraction or dilatation upon a larger or smaller quantity of light falling upon the eye;---And the same want of disposition to contraction and dilatation seems to affect all the muscles which govern the figure of the eye. It is well known that the eye consists of several lenses which paint external objects upon the retina; but that to form distinct pictures of distant and near objects, it is necessary that these lenses should be of different degrees of convexity; and that there are muscles adapted to give them greater or less degrees of convexity, as objects at a greater or less distance are looked at. The eye is accordingly constantly changing its figure as it looks at more distant or less distant objects. These changes are very apparent, when the eye so changing itself, is looked at; and the more particular the attention to any object, and the quicker this attention is executed, it is the more observable; and gives an idea of what is called acuteness in the eye. But on the attack of fever the muscles are not so ready to give it this change of form; so that it appears dull, and as if the patient was not attending to any particular external object.—Further, it would seem, that in order to obtain a true picture on the retina, it is necessary that the eye should be directed to the object; and the quickness with which this direction takes place, also shows to the by-stander the attention of the mind to that object; and gives an idea of acuteness to the eye. On the attack, however, of simple fever, this quick change in the direction of the eye does not take place; and gives occasion likewise to an appearance of stupidity in the eye, in the attack of a simple fever.—Moreover, even when the eye is not directed, by the mind's attention to external objects, to change its figure and position; or when the mind itself is occupied with strong ideas brought up by the memory, and even the eye assumes those positions, (both with regard to its figure, and direction, but especially with regard to its figure,) that it did when it received these distinct impressions; it often has an appearance of acuteness, as if it was actually adapting itself to receive these impressions. This, however, does not happen in the attack of a simple fever;—whether the inaction of the muscles depends upon their own depression of powers, or on the mind's not exciting them, or both, can perhaps be hardly determined.—The whole degree of appearance of stupor, is perhaps very improperly to be ascribed to the mind, (whose effusions are rendered more sensible from the eye than any other organ of the body;) and those who have considered the mind as connected with the body by the brain only, have commonly considered this inactivity of the eye as dependent upon the brain.

The whole *Secretory Vessels* throughout the body secrete a smaller quantity of fluids.—In the first place, the *urine* consists in health, of water in which is dissolved a mucilage which is soluble in water heated to the heat of the human body, but not soluble in water of a less degree of heat: it therefore separates, when the heat is less than that of the human body. In health the urine is transparent when first evacuated; but upon standing to cool, it becomes cloudy, or deposits a sediment. In the attack of fever, this mucilage is no longer found; so that the urine continues transparent when it has stood to cool. Since in all countries where we have descriptions of fever, the air of the atmosphere is colder than the human body, this difference has been always observed; but whether it would take place where the atmosphere is of the same heat with that of the human body we do not know: certain it is, that the urine in health is rendered again transparent by heating it to the heat of the body.—It may be that the secretory vessels of the kidneys are so contracted as not to let this substance pass through; or it may be that it is not in the blood; but is formed in the kidneys in health, but not in fever. The quantity is so very small, (not above a grain in a pint, even when the appearance of it is great,) that it is impossible to detect it in the blood in health, and, therefore, this question cannot be determined; but the contraction of the secretory vessels of the kidneys, during the attack of fever, is evident from the small quantity at that time secreted, as well as from its sometimes being of a paler color.—That the *urinary bladder* is also contracted in the attack of a simple fever, is evident from the small quantity of urine evacuated at a time; (for if the bladder be much disposed to contract, when a small quantity of urine gets into it, it is stimulated to expel it.)—There is a smaller quantity of *feculent matter* evacuated from the intestines during the attack of a simple fever. The feculent matter in the intestines consists partly of that part of the food which is not digested; partly of the bile and other fluids secreted into the intestines, which are not used during the digestion, or if they are used and decomposed, are not absorbed into the blood vessels.—If a man has eat heartily before the attack of a fever, (the food not being digested in less than six or eight hours,) it is either rejected by vomiting, or passes into the intestines, or remains in the stomach. *First*, the stomach does not act upon it so as to make it go through the necessary digestion in the stomach, or to throw it into the duodenum. Sometimes it remains for several days in the stomach, (as the author has seen it rejected on employing an emetic, three, or even four days afterwards;) but this cannot be the case in a simple fever, which does not continue four and twenty hours. *Secondly*, if it passes into the intestines, from their inaction, (in consequence of their depression of strength,) it does not undergo the changes necessary to convert it into chyle; and therefore must pass forwards undigested.—The same inaction prevents the *peristaltic motion* of the intestines from going on, so as to carry the food, or the excrementitious parts of the fluids secreted in the intestines, forward to the rectum to be evacuated. This is one cause of there being less evacuation during the attack of a simple fever.—Another is, that there is a *less secretion of the fluids which flow into the intestines;* and in consequence less to be carried downwards, or to stimulate the intestines so as to increase their peristaltic motion: from both these causes costiveness takes place.—There is one exception, however, which must here be made; viz. that if such nausea should take place as to produce *vomiting*, a much larger quantity of bile, pancreatic juice, gastric juice, &c. is often evacuated; but the author thinks these evacuations should rather be attributed to the second than to the first stage of the fever; as it never happens that a simple fever, or a paroxysm of an intermittent, is *fatal*, if vomiting takes place.—The *dryness* of the skin, of the tongue and mouth, and the want of sufficient secretion in other parts, have already been noticed.—If there be an ulcer, or a wound, in any part of the body, during the attack of a fever, it becomes dry, (as the author has frequently observed); so that the vessels which throw out fluids, even among the muscles, are also apparently contracted.

The *contractions of the heart*, and in consequence the pulsations of the arteries, become more frequent in the attack of fever.—It has already been observed, that the number of contractions of the left ventricle of the heart is very steady in adults in health, and very nearly 73 in a minute: it increases in the attack of a simple fever.—But this increase is frequently not among the very first symptoms. The fever has sometimes come on, and continued for half an hour before there is any increase of the number of contractions; sometimes, however, greater frequency takes place along with the very first appearances; but this hardly ever happens without other symptoms of the fever being present at the same time.—The frequency does not change all at once; but gradually from 73 to 74, 5, 6, and so on to 80, 90, and as far as 100 at least.—In a simple fever, (which terminates in 8, 10, or 12 hours,) it is rarely less than 100; and sometimes in the course of the disease rises to 130 or 140.—In a *simple* fever, the frequency of the contractions is generally greater than it is in *compound* fevers; which is remarked at present, because practitioners (being much more accustomed to see compound [illegible], [illegible] impressed with the idea that [illegible] ascribed to simple fever: the [illegible] continued compound fever being [illegible]—But the varieties which happen [illegible], however, at present to be discussed.

[illegible] greater frequency of the con[illegible] an appearance absolutely necessary to [illegible] just been observed,) the [illegible] before the frequency takes [illegible] simple fever may not prove [illegible] more frequent. Certain it is, [illegible] of an intermittent fe[illegible] commonly become [illegible].—This frequency [illegible] certainly a part [illegible] the frequency has once taken [illegible] until the whole fever [illegible] fevers, where such an [illegible]

[illegible] depends almost al[illegible] left ventricle of [illegible] of the ventricle de[illegible]: for when the [illegible] ventricle which distends [illegible] when the ventricle propels [illegible] them, and stimulates them to [illegible] therefore, must [illegible] contractions of the ventricle. [illegible] but by their elasticity, [illegible] act by a muscular [illegible] experiments and observa[illegible] may happen then, that an [illegible] besides the distention pro[illegible] the ventricle: and the number [illegible] be greater than the number of [illegible] the distention of the blood thrown [illegible] be sufficient to stimulate the artery [illegible] although very rarely, that the number of pulsations of the artery does not accord with the number of contractions of the ventricle.

From the contraction of the arteries being a muscular action, arise *other varieties in the feel of the pulsations of the arteries*, independent of their number.---The arteries may not allow themselves to be dilated to a degree proportionate to the force with which the blood is thrown into them by the ventricle. In this case, the artery, (although it be the same with regard to its elasticity,) will feel larger or smaller in the attack of fever. It feels generally smaller.---This smallness may, however, arise likewise from another cause; for the ventricle of the heart may be contracted at a time that the blood is thrown into it from the auricle, so as to receive blood in smaller quantity, and throw it out in smaller quantity, and in consequence distend the artery less; or it may contract more feebly, and so distend the artery less; or, as has been said, the artery itself may resist the dilatation; and it would seem that all these things contribute to the arteries feeling smaller in the pulsation at the beginning of the attack.---It is to be observed, that in those attacks of fever, which are fatal, the artery continues to feel very small; and feels smaller and smaller, till the patient sinks.---This smallness of the feel of the artery goes off very soon in general; but this will be considered afterwards when the author comes to consider what happens after the attack of simple fever.

As has been said, if an artery only acted by its elasticity, there would be no difference in its pulsations; excepting those which arise from the different numbers of contractions of the left ventricle of the heart, the quantity of blood thrown into it at each contraction of this ventricle, and the force and regularity with which the ventricle contracts:---but many *other* sensations are given by the pulsations of the artery. These other sensations, indeed all the sensations arising from the pulse that cannot be measured by any mechanical instrument, (as the frequency can be by a watch,) but which we may judge of from the feel of the pulse by the finger; require practice to make them sensible, although they should not be very nice; as it requires a practised eye to make distinctions in painting, and a practised ear in music.---As therefore there must be something arbitrary in determining the different sensations given by the pulsation of the arteries, they have been represented very differently by different practitioners; some making them very numerous, others

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[illegible]

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[illegible] coagulable
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[illegible] of the co-
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[illegible] In this case, the
[illegible] very perfectly to-
[illegible] uniform mass.---But if the
[illegible] does not co-
[illegible] first for several minutes;
[illegible] the surface, so that the blood divides
[illegible] part of it being a fluid without any
[illegible] yellowish, and the lower part
[illegible] coagulates slowly, there is an
[illegible] red particles in it; and the
[illegible] serum oozes out, the co-
[illegible] covered on the surface with a

[illegible] the feel
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minutes fluid after it is received into the basin. It is, therefore, the state of the arteries, when their contractions give the sensation of hardness, that occasions the alteration in the state of the blood.---If a vein be opened and blood be let flow from it successively into three different basins, and these be let stand until the coagulation and extrication of the serum take place; it happens frequently that the crust, which has been described, appears in the first basin, and not in the second or third; or it appears in the second, and not in the first or third; or it appears in the third, and not in the first or second; or it appears in any two of them, and not in the third.---It may be, and has been said therefore, that this appearance can show nothing; but is entirely vague. It has been said above, that the appearance of this crust on the top of the coagulum is owing entirely to the blood's remaining long fluid after it is received into the basin; and so giving time to the red particles from their gravity to subside from the top.---There are circumstances in the figure of the vessel in which the blood is received, and in the manner and velocity in which it flows from the blood vessel into the basin, (that make it sometimes become solid sooner or later,) which is the occasion of this variety;---but if the basins be of the same size and shape, and the blood flows into them from the blood vessel with the same circumstances exactly and the same velocity, such variety is never found.---It would be too great a digression to describe these circumstances at present: It is only to be observed, that when there is a strong sensation of hardness, the disposition the blood acquires from thence of remaining longer fluid after its extravasation, is so strong, as to overcome these accidental causes of variety; and a crust is always found upon the coagulum. But when the state of the arteries which gives the sensation of hardness is not strong; then these external circumstances frequently overcome the disposition of the blood to remain longer fluid, and to occasion the appearance of a crust on the surface of the coagulum.

The state of the arteries in the attack of a simple fever, is such, as to give a peculiar sensation to the finger during their contraction.---The greatest part of authors and practitioners have called this sensation *Hardness:* it, therefore, undoubtedly approaches near, or actually is the sensation of hardness.---But it must be observed, that where there is this sensation strongly impressed upon the finger by the pulsation of the arteries in a simple fever, and blood is taken mind without train or connection; and rapidly. Unless the patient's attention be strongly excited to some one object, he does not attend to the impressions made by the organs of the senses; but rather takes his ideas from *memory*, than from the objects around him. If his attention, however, be excited, he is capable of distinguishing the surrounding objects perfectly.---As the delirium increases, the faculty of distinguishing the objects that are around him gradually diminishes; he begins to talk incoherently; a number of disagreeable ideas run now rapidly through his mind without any kind of connection. (He is sometimes in a church-yard among tombs, sometimes falling from a precipice, sometimes wandering in an unknown country, sometimes pursued by wild beasts, &c. An immense number of such ideas keep hovering in his mind.) The disease still increases; he becomes perfectly insensible to external objects; the evacuations take place involuntarily, and without consciousness;---he has an uneasy feel in the skin, and in consequence picks the hairs, or rather attempts to pick the hairs from his bed-clothes; he sees a number of blackish spots flying in the air, which he attempts to catch: even in this state the patient may recover.---But when it comes to its greatest pitch, the *swallowing and breathing* come to be affected: when this is the case, he is almost always cut off.---These appearances take place in all kinds of delirium; but that which takes place as a symptom of the *first* stage of a simple fever, is attended by these appearances *only*.

With these symptoms, a sense of weight, fulness and uneasiness takes place in the *breast;* sometimes tumor and hardness about the *pit of the stomach*.---This anxiety and restlessness are totally different from and independent of that universal restlessness which takes place all over the body, already described: they are frequently in very different proportions to one another; the feel of the one is very dissimilar to the sensation which the other excites. It is that kind of anxiety and restlessness which arises in grief, fear, and other passions of the mind; and which is, at the same time, attended with paleness and diminution of size of those veins which are seen superficially.---It would therefore be suspected to take place from more blood in the large veins pressing on the heart, than could well pass through the lungs. In those dissections which have been made of patients who have died in the attack of a simple fever, the large veins going to the heart, (that is the vena cava, both superior and inferior,) the right auricle of the heart, and the pulmonary arteries, have been found distended with blood to a much greater degree than they are commonly, when death takes place from other causes.

Sometimes difficulty of *breathing* also takes place, and *cough;* but this is by no means constant.

While these derangements take place in the other parts of the body, the *stomach* has particular affection in *itself;* independent of those which it has in common with the other parts of the system.---Besides the sensations of taste, smell, seeing, hearing, and feeling; there are others which do not depend upon, nor are received from the mouth, nostrils, eyes, ears, or skin. This needs explanation; for no language has ever yet become so copious as to express the varieties in the senses. Those sensations which we receive from other parts of the body, than what are commonly called the organs of the senses; are expressed by the term we apply to the sensation received by the skin: We say, for example, that we *feel* hunger and thirst. Although we say that we *feel* pain; yet the idea held generally is not that pain is particularly attached to the skin, or other organs of the senses; but that it is in *various parts* of the body.---Hunger is commonly referred to the stomach. It does not seem, however, that it is always clearly an affection of the stomach.---When the blood-vessels have been greatly *emptied,* (either by increased secretions or blood flowing immediately from them, by want of sufficient nourishment in health, or by want of nourishment or wasting of the fluids during the progress of a disease;) if the person should come into perfect health, and only remain weak, the appetite is generally very great, and even beyond the powers of digestion. The hunger, therefore, in this case seems rather to be an affection of the blood-vessels, a desire to fill themselves; than any particular affection of the stomach itself.---On the other hand when the vessels are very *full,* there is often no appetite; although the stomach is not in the least incapable of digesting a large quantity of food, (if thrown into it,) without inconvenience.---Although hunger therefore, or want of it, is generally referred to the stomach; it may be doubted, in some degree, if it be an affection of the stomach at all times.---It is not meant to be said by any means, that hunger can take place when the stomach is diseased; (excepting in that disease, the principal symptom of which has been considered as consisting in a voracious appetite.)

In the attack of fever, the sensation of hunger not only does not take place;---but if it was strong, the moment the attack begins, it ceases. The author has known several instances, where persons sitting down to table with a strong appetite (an attack of fever having suddenly taken place) in less than two minutes they have been unable to eat any thing; and have been seized with perfect *aversion even to the smell of food.* This aversion to the smell, or to the sight of food, or its even being mentioned; is often very strong during the attack of fever.---(What happens with regard to this, in the other stages of simple fevers, and during the continuance of compound fevers; will be taken notice of afterwards.)

Nausea likewise happens often at the first attack; and this is sometimes increased to such a degree, as to occasion vomiting.---Commonly vomiting does not take place at the very beginning of the attack; but the disinclination to food increases gradually to nausea, then to vomiting; which in some cases is very severe;---not only the contents of the stomach being evacuated, but likewise those of the duodenum, and of the glands, the secretory ducts of which open into it. (The principal of these are the ductus communis choledochus, and the duct of the pancreas.) Bile, therefore, and the pancreatic juice are thrown up, together with the contents of the stomach, and the other fluids secreted into the stomach and duodenum.---Of all these fluids *bile* is the most conspicuous, from its color, taste, and smell; and it has often been observed by practitioners; while the gastric and pancreatic juices, and other juices secreted into the duodenum, (as they are not very conspicuous from their sensible qualities,) have not been taken into the account.---It has in consequence often been supposed that the redundancy of bile constituted an *essential* part of the attack of fever; whereas its evacuation is merely *accidental.* If the pancreatic juice had been blue, and possessed any particular taste or smell; and the bile had been colorless, insipid, inodorous, or as much so as the pancreatic juice is; in that case, whatever has been said of the redundancy of bile, as an essential part of the attack of fever, would have been said of the pancreatic juice.---It is certain that no experiment hitherto made public has shown, that any *bile was ever contained in the blood-vessels,* unless in case of jaundice; and that, therefore, there can be no redundancy of bile, excepting as far as a greater quantity may be contained in the biliary ducts and gall bladder. Much more than *this* is thrown out by twenty times in the attack of a simple fever in half an hour.---Therefore, the bile thrown out is a *consequence of the sickness;* (exactly in the same manner as it is a consequence of the sickness arising from the agitation, in a ship at sea;) and is not at all to be farther regarded than as mere *accident* in the attack of fever.---(The loss of appetite increases, and the nausea and vomiting take place so instantly, at the beginning of fever; that they can hardly be conceived otherwise than as an affection of the *stomach itself.)*

Thirst we also express by the term, feeling.---It is commonly referred to the mouth.---Certainly, when the glands of the mouth do not secrete a sufficient quantity of fluid to keep the membranes moist, this sensation arises. Although the glands of the mouth may secrete their ordinary quantity of fluids; yet, nevertheless, a greater quantity of air passing backwards and forwards to the lungs, through the mouth, in speaking and breathing, (so as to dry the membranes,) excites this sensation.---*But* thirst may arise when the membranes of the mouth remain perfectly moist. When the membranes of the mouth are perfectly moist, if a large quantity of watery fluids should be *evaporated* in the form of insensible perspiration, or *exude* from the skin in sweat, or be otherwise thrown out by any of the excretory organs which commonly throw off watery fluids, (as, for instance, in diabetes,) great thirst ensues; although there does not appear to be any particular affection of the mouth.---We cannot say, therefore, that an affection of the *mouth* is the cause of the thirst; because the sensation may be as well produced by a simple want of water in a sufficient proportion in the blood-vessels: and thirst, from this cause, commonly produces a desire to drink whether the mouth is disordered or not.—At the time of an attack of fever, the mouth may sometimes be moist: thirst, nevertheless, usually takes place. It frequently happens, that attacks of fever come on when there is no reason to believe, that the *proportion of water in the fluids* has been diminished, or is less than in the ordinary healthy state of the body: —It may, therefore, proceed from an *affection of the stomach.* That this is capable of exciting thirst appears evidently, from the thirst which often arises from salted food thrown into the stomach, while it certainly still remains there; or during the digestion of food used in too great quantity or of difficult digestion. It would, therefore, appear that the loss of appetite, aversion to food, nausea, vomiting, and thirst arising in the attack of fever; indicate that the *stomach* is particularly affected.—*This* affection of the stomach *might* be supposed to be owing to the depression of its powers. The powers of the stomach may not be sufficiently great to digest a great quantity of food; yet the appetite may not be lost; (as is often seen in convalescence from fever, where it frequently is great, although the powers of digestion are weak.)—*Thirst* also can by no means be attributed to depression of the digestive powers of the stomach.—It may, therefore, be concluded, that there is a *peculiar affection of the stomach* in the attack of fever.

Fever (from its appearances which have been enumerated) shows in its attack, depression of the powers of the *mind;* of the sensibility of the organs of *sensation;* of the powers of *exertion,* and of the *disposition to be stimulated,* in the body. It shows likewise *contraction in the vessels* throughout the system; (which being either confined to or greater in the smaller vessels, occasions a larger quantity of blood to be accumulated in the large vessels near the heart.) It also shows some *peculiar affection of the stomach.*—These sensible appearances in fever seem so *very independent upon one another,* (excepting the quantity of blood accumulated in the larger vessels in consequence of the greater contractions of the small ones;) that they can only be considered as symptoms of some alteration of the system which has *not hitherto been investigated:* therefore, every thing that has been said relating to the essence of this disease has only been conjecture following wild conjecture; (to which the author does not mean to add.)

Almost all the properties of *fluids* were unknown to the Greek and Roman physicians. Every thing which they grounded upon their properties or their proportions, or the properties of the *solids,* (such as redundancy of bile, phlegm, blood, black bile, heat and cold, moisture or dryness;) was merely the phantom of their brain. Not but that their attention and accuracy in the history of disease, was extremely great.---It is but very lately, (and partly owing to the author's experiments,) that the blood was known to consist of *red particles,* insoluble in solutions of the neutral salts contained in the other parts of the blood; *coagulable lymph,* (a fluid coagulated on extravasation) which was discovered by Senac; *serum,* a fluid not coagulable on extravasation, but coagulable by heat, discovered by a *student* in anatomy, something more than two centuries ago;---a solution of natron muriatum, ammonia muriata, and ammonia phosphorata; sometimes calx vitriolata and calx muriata; a solution of putrescent mucilage; likewise water diffused through the other parts.

An attack of fever takes place when *these parts of the blood are in various proportions to each other*, (as has been ascertained by experiment.)---The *red particles* differ in their color; and in being perfect, or broken down into smaller or irregular shaped masses, (which but rarely happens.)---The attack of fever takes place in any of these cases.---The *coagulable lymph* sometimes coagulates immediately on being taken from a blood-vessel; sometimes it remains fluid for a few minutes, so as to allow the red particles to fall to the bottom before it coagulates. It sometimes coagulates more firmly, sometimes more loosely: the *serum* sometimes separates more completely from the mass, than at other times. Heat coagulates it sometimes more, sometimes less readily and firmly.---In all these cases attacks of fever take place.---There is, therefore, no *sensible state of the fluids* contained in the blood-vessels, peculiar to fever.

An imaginary being, (such as the *spiritus archeus* of Van Helmont,) or as imaginary an *obstruction*, (such as that of Paracelsus and Boerhaave;)---cannot be taken as a ground on which to found the phenomena, or the practice in fever.

Although contraction of the small vessels is a part of the external appearance, which take place; yet converting the Latin word *contraction* into the Greek word *spasm*, does not make it the essential part in fever.---This term has been applied so variously, that it gives no strict or defined idea. There are certain parts of the body which are capable of becoming shorter in one direction, (independent of their chemical or mechanical properties;) this shortening has been called *contraction:* it is produced by ideas of the mind, volition, or stimuli applied. When there is no appearance of any idea of the mind, volition, or the application of a stimulus, a moving part sometimes contracts: this contraction has been called *spasm*.---It has happened when a moving part contracts in consequence of an idea of the mind, volition, or the application of a stimulus; that the contraction continues long after these causes cease to act: when it *continues longer than the usual time, it has been called Spasm.*

When any vessel has its sides shortened in the direction round the vessel, its diameter of course becomes less; and the vessel is said to contract.---All the moving parts are contracted to a greater degree in a living body than they would be, were the body dead. This has been called the *Tone* of the parts.---This contraction is constant; but not always the same in degree: It is often greater or less, without any alteration in the health.---The blood-vessels are constantly pressing upon the blood in their endeavor to become smaller; but are prevented by the blood contained in them. (That this is the case is evident; for if any opening is made in a blood-vessel, blood is thrown out.---It may be said, that the power which forces it out, is that of the circulation: but the pressure of the sides of the blood-vessels must be equal to the force of the circulation; otherwise they would be distended and enlarged to a greater degree, as action and re-action are equal and contrary.) If the action of the powers producing the circulation be weaker, the blood-vessels, (if every other circumstance be the same,) will be smaller in their diameter; or, (supposing the force of circulation in a blood-vessel be the same,) if the tone of the vessel should increase, the vessel will contract and become smaller in its diameter.---But the force of the powers of circulation continuing the same and the tone the same, contraction in the vessels of a part may take place, in consequence of some application to it; (as when we apply astringents, for example, which act without affecting the chemical or mechanical properties of the part.)---When the blood-vessels of a part, in consequence of any such cause, contract, and the cause is removed; it sometimes happens that the contraction goes off, sometimes that it continues. A man sitting in a warm room shall have the blood-vessels of his hand of considerable size: if he puts his hand out of the window into the cold air, its blood-vessels will contract: returning it into a warm air, they shall sometimes be enlarged again in a short time, and sometimes they shall continue contracted after this cause of contraction is removed:---this has been *called by some spasm.*---If the blood-vessels should contract apparently without *any* cause, (the force of the circulation and their tone remaining the same;) that contraction bears an analogy to that which happens in like manner in the muscles, without any apparent cause; and is *also called spasm.* (As no effect, however, can take place without a cause, such contraction must arise from some cause, although it be not apparent.)---Again; there is a certain degree of regularity, which takes place in the contractions of the various moving parts: if it does not, the irregularity has frequently been *called spasm*. (For example, in the peristaltic motion of the intestines, there is a regular motion which takes place spirally downwards. If two rings should remain contracted some time, so that a vapor is confined between them; or if one ring should contract strongly, and press the interior part, so as to give pain; if either of these irregularities should take place, it is called spasm.)—Pains arising in any part of the body not referred to any apparent cause, as hemicrania; have been *called spasm*.—The term has also been applied in a variety of *other ways*.—Now the contraction which takes place at least in the small vessels, (the appearances of which have been pointed out,) if it can be called spasm, is of that kind where the vessels contract from some cause, and *remain* contracted after the cause is removed. But all the causes of fever do not apparently produce contraction; and contraction is by no means the only appearance that takes place in fever; and the other appearances are totally unconnected with it, as far as can be judged.---It is, therefore, much more probable that this contraction is *not the essential part of fever;* but is produced by the fever, continues as long as the fever, (which is its cause,) and goes off when it is removed.

Others have taken the term *spasm* much more generally than in any one of these senses. They give this name to every preternatural motion or affection of the system, which has arisen without any alteration in the chemical properties of the solids or fluids, or any introduction of extraneous matter into the system.---Under this definition, it would not, perhaps, be difficult to admit that fever is spasm; but for any purpose of understanding the history or manner of treatment of the disease, this would be useless.

Converting the Latin word contraction into the Greek word spasm, will not cause the depression of the powers of the mind, of sensation, and of the exertion of the powers of the body; nor the diminution of the susceptibility in the body of being affected by those external applications, which in health tend to excite motion or to produce rest; to become dependent upon contraction:---nor will it make the peculiar affection of the stomach dependent on it.---What therefore is the *real derangement in the system* which produces the external appearances in fever, it must be owned, is not at all known.—Therefore, without attempting to make conjectures, the author will pursue the *history of the disease* as it manifests itself by external appearances.

These symptoms of the attack of fever which have been enumerated, however much they may be varied in degree or proportion, constitute the *whole disease*.—The more numerous and violent they are, so is the fever itself more violent: when they are all gone off, the fever no longer exists.

Fever then is a disease, the *Essence* of which is not understood.—It manifests itself by a depression of the powers of sensation, irritability, and action in the body; and likewise of the power of memory, imagination and judgment in the mind; with contraction of the small vessels throughout the body; an accumulation of fluids in the large vessels; and some particular affection of the stomach.

It may be a question, whether it be best to proceed to the description of the *subsequent stages* of the disease; or *investigate the causes* which produce it.—The *subsequent Stages* depend entirely upon the attack; and if the fever goes off, cease. Although these subsequent stages require much attention in the course of the disease; they are nevertheless *no part of its essence*.

The *Causes* of disease have very frequently been taken from hypothesis.—It is not the author's intention to enter deeply into metaphysical reasoning; yet precision of ideas has been so little attended to in medicine, (where it is more necessary than in any other science or art;) that he thinks he may be allowed to make the following observations.—The mind can form an idea that an effect may take place without any cause; (as for instance, that the Almighty existed from all eternity, with all his powers, without any cause.) It is from experience alone the doctrine springs, that effects have causes.—We find when the beams of the sun touch the atmosphere in any particular part of the earth, that day-light begins to appear; that the light continues to increase, until they fall upon the earth in a perpendicular direction; that as the sun descends, the light diminishes; and that when his beams no longer touch any part of the atmosphere, in that part of the earth day-light totally disappears. Of this we have constant and daily experience: therefore we are led to believe that rays coming from the sun (whatever they may be) are the cause of day-light.—In this case, the reference of effect to cause depends entirely upon experience.

In treating of fever, nothing is to be *admitted as a Cause*, the knowledge of the action of which does not depend upon *experiment*. Our experience of cause producing effect, rests entirely on one event happening, and another succeeding.---It is no *single* event following another, which can establish that the preceding one is the cause of the other.---If a noise produced by firing a musket should be heard, and immediately afterwards a man should fall down dead; it might strike the mind with an idea that the *noise* of the musket was the cause of the man's death. Still it ought to be considered as in the very slightest degree of probability, that this was the cause of his death; (which might have happened in consequence of apoplexy.) It is only from finding men dead frequently after the report of musketry, that musketry can be considered as the cause of death.---If the report of many muskets was heard, and a number of men were found dead upon the spot from whence the noise seemed to proceed; we should immediately conclude that they had been killed by the muskets: but although this had a considerable degree of probability, it might be erroneous; for the musketry might have fired at review without ball; and the men might have been passing over a piece of ground where a large quantity of gas was rising up, without attending to their danger, until they were suffocated.---In the present instance, another very material circumstance must be adverted to: it often happens that two concomitant effects take place from the same cause: the noise of the gun, and the death of the man, are both the effects of the discharge of the gun; but it is not the noise which is the cause of death.---It may be supposed, that a person may never have seen a gun fired; but may frequently have heard the noise occasioned by it, and have seen a man drop down immediately afterwards: his experience will have led him to believe that the noise killed the man; and that it reached this person with an effect that did not fall upon himself, (since he remained unhurt.)---It requires, therefore, an extreme great caution in assigning an effect to a cause, not to be deceived; first, in believing (from one thing happening before another) that the antecedent is always the cause of the consequent: because the precedent may be accidental; or they may both be concomitant effects,---It may be thought superfluous to have made these remarks, but it must be considered that the author is not writing for metaphysicians, but for practitioners in medicine; not one in a thousand of whom ever thought of paying the least attention to the operations of the human mind.

Of the *number of causes* to which fever has been ascribed by the practitioners who have treated of this disease, few will bear the test of any strict inquiry.---It is not worth entering into any refutation of many of them; but it is better to take a view of *those causes which are most strongly marked.*

The first to be noticed is *Infection.*---Fever has frequently taken place in a man who came near a person afflicted with the disease, although he has not touched him. It is very possible that this person (so taken ill of fever after he had been near a person ill of it) might, from some other cause, have been seized with the disease. (For example, he might have been inoculated for the small-pox some time before; and the fever which took place might have been in consequence of that inoculation.)---By repeated experience however it is now known, that although it very frequently happens that a man coming near another afflicted with fever, is not afterwards affected with the disease; yet of any number of men, one half of whom go near a person ill of this disease, and the other half do not go near any one so diseased; a greater number of the former will be affected with fever than of the latter, in a short period afterwards.---In some instances the proportion is not very different; in others, the author has known *seven out of nine*, who went near a person afflicted with fever, seized with the disease in the space of *three weeks* afterwards. ---There is, therefore, a perfect ground from experience for believing, that coming near a person afflicted with fever is a cause of the disease.

The mind searches farther in this case: it will not be satisfied that the *mere vicinity* of a man afflicted with fever can be a cause of the disease; (because it has no experience of vicinity having any effect, excepting by attraction or repulsion.)---The universal belief therefore has been, that there is *some matter rising* from the body when afflicted with fever; which, being applied to the body of another, gives occasion to the disease in him.

If there be *any such matter*, it is perfectly incapable of being discovered by any of the organs of the senses.---Where a man is afflicted with the most infectious fever, if he be in a clean room with clean bed-clothes; neither the eye, the taste, smell, ear, nor feel give the smallest notice of there being any infection present. It is true indeed that a felon coming out of a dirty gaol, spreads noxious vapor very sensibly, and very fatally; but the author has often experienced, both in St. Thomas's Hospital and in other places, that patients have lain ill of fevers very infectious, (and from whom infection has been actually received, so as to produce the disease in other persons;) where there was no peculiar smell or taste, nor any thing sensible to the eye in the atmosphere surrounding them, or to the feel.

Although this infectious matter is not an object of the senses; yet that there does arise some matter from persons in fever, is further rendered extremely probable from the circumstance---that a person *coming* from a man afflicted with it into *another room*, where there were persons in health; some of these have afterwards been seized with the disease, (sometimes several;) as the author has known instances of.---A peculiar matter, therefore, is probably generated in the body of a man in fever; which being carried by the atmosphere and applied to some part of the body of a person in health, causes a fever to take place in him.

This matter has been supposed by some incapable of communication by other means, than by the *touch* of some part of the body.---That this is not the case is most certain, from the author's experience; for he has seen several persons affected, who only accidentally came into the room where the patient lay ill; without coming near him, or touching any thing in the room excepting the floor with the soles of their shoes.

The *other* properties ot this infectious matter are by us not at all known; as its existence is only known by its effect in producing the disease. (No chemical examination of any of the fluids or solids of the body has ever shown its existence.)

This infectious matter is produced by all fevers whatever.—However (as far as the author knows) no person has been seized with fever in consequence of coming near another afflicted with it, where the fever consisted of *one paroxysm only*.

That *intermittent* fevers produce this matter, (or in other words, are infectious,) the author knows from his own observation; as well as from that of others.—But intermitting fevers are not nearly so apt to produce it, or at least to propagate it, as *continued* fevers; (and the more violent the continued fever is in its febrile symptoms, the greater quantity of infectious matter is produced.)

When a number of persons live in a small space, (supposing even that they are kept as clean as possible), it happens frequently that fever arises in some, often in many of them.—It has been in this case supposed, and is extremely probable, that some peculiar species of matter is generated, capable of producing fever on being applied to the body. If the air in such places be not frequently changed, the quantity of the infectious matter and its power are greatly increased; and [illegible] often extremely bad.

This source of infection is not peculiar to the human species.—If a number of sheep be confined in a small space without sufficient renovation of air, an infectious matter is generated; which produces fever in them.—Fevers also arising in these animals occasion the formation of infectious matter.—Of this the author had an opportunity of being well acquainted during the American war; when live sheep were attempted to be transported from England to America, and it was necessary to confine a number of them together in one ship. Although they were selected from flocks in perfect health, and proved to be perfectly sound when taken in small numbers to serve for fresh provisions for the officers; yet in many of the ships where numbers were confined, an infectious fever arose; even before they quitted the harbour. Whether it be that sheep are more subject to produce infectious matter when many of them are confined together; or that it must frequently happen that many of them are confined together in a small space (without sufficient ventilation) than in quadrupeds of other species; infectious matter is much more commonly generated in them, than in any other quadrupeds that are known.

Live hogs were also attempted to be exported in the same manner: and infection was produced among them, although not so frequently.—It would appear that the infection which produces fever (either arising from fever itself, or from numbers confined in a small space,) in *one species of animal;* is not capable of producing fever in *another* species; for it happened that when one side of a ship contained sheep and the other hogs, if a fever broke out among the sheep, the hogs were not affected; and that when fever broke out among the hogs, the sheep in many cases were not at all affected.—The *crews* also were not at all affected; being as healthy as those of other ships making the same voyage, loaded with different commodities.

The infectious matter produced by a number of men living in a small space, as well as that produced by fever, may *adhere* to a person in *perfect* health; so as to be brought into another place, and occasion the disease in a great part of the whole assembly; (as has been too often proved by a felon brought from a goal into a court of justice, and infecting almost the whole of the persons assembled; and that, even when the felon himself was perfectly free from fever and never had been affected by the disease.)

It often happens, when numbers of persons are confined together in a small space, that *putrescent substances* are not thoroughly cleared away: hence, a person brought out of a gaol where putrescent substances have been accumulated, carries with him substances of a peculiar *smell*.—Some therefore have supposed, that the infectious matter produced in this *last* way has *sensible qualities*.---This is undoubtedly, not always the case; since infection has arisen from a person brought out of rooms in which numbers had been confined for several months, but kept clean from all putrescent matter; (so that there was no particular smell, about him, or any alteration distinguishable by any other of the senses.)---In one case that came under the observation of the author, a person under such circumstances, (from whom *no peculiar smell* arose or any other sensible effluvia;) communicated the infection to *four others*, with whom he was carried in a coach for about half a mile; so as to produce fevers in all of them, which fevers were violent and fatal.

As therefore neither the infectious matter produced in the *body* of a man afflicted with fever, nor that produced by a *number of men* living for a certain time in a small space; has any other sensible quality than that of producing fever; it cannot be determined whether it be one species of infectious matter or different ones.

The vapor or other matter which arises from *putrifying bodies*, (either animal or vegetable,) being applied to a person in health, also occasions fever.---From putrifying substances, we know that there arise gas, inflammable air, and a vapor resembling in its smell what has been sometimes called hepatic air.---It does not appear however to have happened, that fever has arisen soon after the application of any of these vapors, when produced in other ways; (as for example, when gas arises from the earth, as it does in the caves near Pyrmont, or when it has been detached by acids from calcareous substances; it has never produced fever.) Neither have men ex-

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when the greatest part of it was under the dominion of the Abbassides. If mankind had one origin, undoubtedly this disease could not have existed from the *beginning of the world*; otherwise it must have descended to the Greeks and Romans; who, certainly, were not acquainted with the disease.---The probability of its arising originally at any one period of time, or any other, is therefore, exactly equal. The Romans were well acquainted with all the parts of Africa, Egypt, Arabia, and Asia, which were under the dominion of the Abassides: therefore certainly it did not then exist in, and was not brought from, any of those countries. It is more probable that it was first *generated* in Asia, during the reign of that dynasty.---There is some suspicion of *one other* source. It might have existed in, and have been brought from, Indostan. It is singular that such a disease should be so little noticed in a country, with which not only England, but many other European nations have had so much connection. The reason is, that all *infants* are inoculated by a set of itinerants, whose sole business it is to traverse the country for that purpose. Although, therefore, the Greeks and Romans had some intercourse with Indostan, they might not (more than ourselves) have observed, or been infected with the disease.---Variolous matter has its infection (like the infection produced by fever) confined to the *human species*. Whether other similar infections exist among other animals has not been ascertained.*---Variolous matter is capable of producing fever, applied while floating in the air to some part of the body; (but which part, is unknown).---Some have contended, that it is necessary that some substance covered by the matter, should be actually applied to the body in a solid or fluid form; and not floating in the air. But in the first place, the author has known several persons infected, certainly without any such contact: even persons going into a room where the patients laboring under small-pox were confined, have brought the variolous matter adhering to their clothes, or bodies, into another place where persons were, who never had been affected with the disease; and have communicated the infection without contact.---Moreover, the author has rubbed variolous matter upon the skins of persons who have never had the disease, and where there was no wound; without producing the disease in such persons. If variolous matter be applied to the nostrils in a fluid form; the disease will frequently be produced.

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* [This was written before the kine-pox was attended to.]

If the scarf skin is raised by the smallest puncture, and variolous matter is applied: the fever will ensue.---When variolous matter produces the disease, the fever does not arise immediately: When it is applied, by making an opening through the scarf skin or deeper, an inflammation takes place; and a suppuration ensues. As soon as this operation is completed, (which is on the seventh or eighth day,) the fever comes on.---When the matter is applied by floating in the air; it is generally about *fourteen* days before the fever is produced.---When any pustule is formed, from applying variolous matter in a fluid form to a puncture, made so as to penetrate the scarf skin or deeper, the *matter of such pustule* is capable of propagating the disease.---The quantity of matter so applied is certainly not necessarily more than the thousandth part of a grain; probably not more than one of a great many millionth parts of a grain,

Another matter to which the observations may be in general applied, that have been made with regard to variolous matter; is that which produces fever followed by the *Measles*.---It seldom happens however (although it sometimes does) that the introduction of it into a wound penetrating the scarf skin, produces fever.

There are other matters producing fever, followed by what has been called *Chicken-Pox*, *Swine-Pox*, &c.; which are much slighter diseases; and have not been well defined.

Another kind of infection which produces fever, is that which produces the *Plague in Syria*.---Every disease which has, in a short time, been very fatal to a great number of the inhabitants of any country has been called the plague: (a fever, for instance, accompanied with a dysenteric affection at Naples; or a remittent, upon the Euphrates, as described in the Transactions of a Society for promoting Medical and Chirurgical Knowledge, in London.)---That which takes place in *Egypt and in Syria*, and of which a clear description has only been given by Dr. Russel; arises certainly from an infection of a particular species.---It cannot be gathered from the accounts whether this may be originally *produced*, (without having been propagated;) as the first class of infections are.---It is followed most frequently, if not always, by inflammations of the lymphatic glands.---This infection has sometimes been brought into Europe, (as was the case at Marseilles);---but that disease called the plague which ravaged this country, (England,) on considering the histories of the disease, seems to have been a fever produced by infections of the *first class* which have been enumerated.---(For the inhabitants of this country, it is undoubtedly a matter of great moment to decide this point; but it would make too great a digression. The author may, perhaps, lay the evidence before the public in an appendix.)

All and every kind of infectious matter capable of producing fever or any other disease, by floating in the air and being applied to some part of the body; is *capable of chemical combination with the vapors that constitute the atmosphere.*---In this, as in all other chemical combinations that are perfect, the properties of the elements are lost; and new properties are acquired. The atmosphere is found to consist of various vapors; of which air, or as it has been called pure air or respirable air, forms at present about a fourth. Gas forms some part; but the greatest part consists of one or more vapors; which, without any positive quality, (but only from indolence, which makes mankind in their researches attempt to find a resting place,) have been considered by many chemists as one individual species, under names of phlogisticated air, &c.---Which of these vapors that constitute the atmosphere, unite with the infectious substances creating diseases, is not known. If it were not for this combination, those infections would soon spread desolation over the whole earth.—How *far* a quantity of infectious matter may be carried, without being combined with some of the vapors constituting the atmosphere, is not known: certainly not to a great distance. It appears pretty clearly, that the infectious matter of the plague cannot reach more than *twenty or thirty* feet; since men may converse with those afflicted with the disease at that distance with perfect safety.---*Variolous matter* seems capable of reaching farther; since there is an instance of soldiers passing through a town in which there were patients in the small-pox, being infected, although they passed through the middle of a broad street with celerity, in order to avoid the infection. It is not however to a very great distance that it can reach, without combining with the air, so as to have its properties destroyed. The distance depends, undoubtedly, partly upon the disposition of the atmosphere.---Not only the *infectious substances* floating in the air capable of producing fevers and other diseases, but likewise the *essential oils* arising from vegetables, and *vapors of other* kinds which affect the sense of smelling; are so combined with air, as to lose these properties before they reach that distance, where they should be so diluted as to become insensible.---If the *air be loaded with moisture,* they reach to a much greater distance. Vapor arising from a field of beans, for instance, or a putrid ditch; is sensible to the nostrils at a greater distance, if the air is moist.---Hence it has been conjectured, that those infectious substances which float in the air, producing fevers and other diseases; may be carried farther, when the atmosphere is loaded with moisture. But this has not been determined by any accurate experiment.---(It is hardly worth noticing the superstitious idea, that meat raised up into the air during the prevalence of infectious diseases, would putrify: and other things of the same sort, founded on no ground of experiment.)

There are many infectious substances which float in air, or may be applied to the human body otherwise, which *produce diseases of a particular part,* occasioning affections of the whole system; and that have often been called fever: but these affections of the system are by no means the disease the author describes under that name.--The matter which produces the erysipelatous sore throat, called putrid, (being the sore throat attended with ulcers, &c.) is a matter which rising from a person afflicted with that disease, communicates the disease to persons not affected. The disease produced in this case, is in the first instance, an inflammation of the *mucous membrane* in the throat; and sometimes of those in other parts of the body. In consequence of this, an affection of the whole system takes place; which depends entirely on the disease in a mucous membrane: for when this ceases, the affection of the system ceases likewise.---Although therefore this affection of the system has many appearances similar to those which arise in fever; yet they differ most essentially from this disease.

In the *small pox,* if the infectious matter be applied to a wound, an inflammation is produced in that wound; in consequence of which, suppuration takes place, (as has formerly been described,) and a fever arises. If the *poison of a bee* be infused into a wound made by the sting of the animal, or if the poison of any other animal be injected into a wound from its sting or tooth; an inflammation arises in the part where the wound is made; and that inflammation produces affection of the whole system; some of the symptoms of which may be similar to fever, but are not the disease intended to be described here by that name.---So in like manner it might happen that a great inflammation might be immediately produced in a wound, into which *variolous matter was infused;* and that such an inflammation might produce affection of the whole system in a *day or two afterwards:* yet that affection is by no means to be called fever; the fever which takes place being only induced *after the suppuration of the wound is complete,* (which is on the seventh or eighth day.)---It is also to be observed, that when in consequence of a fever produced by infectious matter, some topical inflammation arises and the fever is carried off by it; that such topical inflammation, (as in the small-pox,) produces affection of the system; in which some of the appearances are similar to some of the appearances which take place in fever. Such affection of the system has frequently been *called* Fever.---In the small-pox, for instance, such affection has been called *secondary fever;* although in no way having any thing of the essence of this disease.

It happens likewise that fevers *not* produced by infectious matter of any kind, give occasion to inflammation; and that such inflammation produces affection of the system; which has been called by some authors fever.---This will be considered fully afterwards.

What the author has been endeavoring to inculcate at present is, that when infectious matter produces any topical affection, and the topical affection produces affection of the system which depends entirely on the continuance of its cause; (so that the affection of the system disappears or begins to diminish, and gradually goes off as soon as the topical affection ceases;) such affection is not the disease described in this treatise under the name of Fever.

The next cause producing fever is *Sudden Exposure to Cold.*---It happens undoubtedly, that infectious matter having been applied to the body so as to produce fever, it may be sometime afterwards before the fever arises; but the author is not disposed to allow that sudden exposure to cold, occasions fever to take place, unless *some symptom* of the disease appears *immediately.*---It must be observed, however, that it is not necessary when a fever arises from any cause, that a *complete* attack of the disease should take place at once. It often happens that some slighter symptoms appear, and continue for several days; before a complete paroxysm takes place, or the fever can be said to begin, (as will be afterwards explained.) When a man for instance, is exposed to putrid vapor; it happens frequently that head-ach, languor, loss of appetite, and restlessness take place; and continue for two or three days, or even a much longer time, before a perfect paroxysm comes on.

A distinction at present wanted to be made is, that between the three first sorts of infection on the one side, (viz. that which is produced in the body of a person affected with fever; that which is produced by many men living in a small space; and that which is produced by putrefaction;) and variolous and other matters producing eruptive fevers, and perhaps pestilential matter, on the other side; there is this difference:—that when symptoms of the first stage of fever (such as head-ache, languor, &c.) take place from the *first class*, they frequently go off again without any fever ensuing;---but that when these symptoms take place from the *second class*, whether they continue or go off, the fever certainly ensues.

When these partial febrile symptoms arise from infectious matters, they frequently occupy only some part of the system at first; continue for a greater or less time without forming a perfect paroxysm: go off suddenly or slowly: or after continuing some time, they all at once bring on a complete attack of the disease.

The mind of man is so much impressed with the idea of referring effects to causes, that it will not be satisfied without resting itself upon some cause. Sudden exposure to cold produces diseases so frequently, that when persons (at least in this country) are seized with disease; and cannot remember any thing which happened out of their ordinary course of living; they rest on the idea that they have caught cold.---But if a man had been suddenly exposed to cold, and continued in perfect health for *four and twenty hours;* the author would never allow that fever or any other disease was owing to it.---A person may have come near another in very violent fever without catching the disease: and he may be suddenly exposed to cold without having fever produced in consequence. (We know that in Russia, as well as in other parts of the earth, men out of an heat of at least 160° of Fahrenheit's thermometer, plunge themselves suddenly into snow, or water cooled to the freezing point; without fever or any other disease being the consequence.) Some practitioners of great eminence have believed that sudden exposure to cold never produced fever, or any other disease.---A rule of evidence must be applied here which has already been taken notice of. Although a person may be exposed to a cause of disease without catching it for instance, yet every person exposed to the air near a patient afflicted with fever is not seized with the disease; but a greater number of those exposed to it, are seized with the disease, than of those who did not come near persons afflicted with fever. This therefore is a sufficient ground for believing that such exposure is the cause of the disease.---So if a greater number of persons suddenly exposed to cold have been seized with fever, than of others who were in other respects in the same circumstances; it is a ground sufficient to establish, that sudden exposure to cold is a cause of this disease. But the evidence is much stronger in this case, than in that of infection; because the author has seen many instances, where from the exposure to cold, the commencement of the disease was instantaneous; and many are to be found on the records of medicine.---The author assumes that this cause only operates when its effects are to be *immediately observed*, either as instantly producing the disease, or such symptoms of it as afterwards spread over the whole system so as to make a complete attack;---for (as has already been observed) when a cause of fever is applied, it happens not uncommonly, that head-ach, languor, and other symptoms of the attack or first stage of fever take place, and continue for some days, (as far even as *fourteen* from the author's observation) before a complete paroxysm is formed; but this will be discussed more fully afterwards.

The feel of heat or cold by no means indicates the real temperature of the atmosphere.---This is a subject so well understood, that it is sufficient to observe that by sudden exposure to cold is meant, the going out of a warmer into a colder *medium;* whether it be the same, (excepting as to its temperature) or different in substance. For example, such an exposure may arise either by going out of the air of the atmosphere into the same *air*, only of a lesser temperature; or by going out of warm air into cold *water*.---It is not of consequence that the change should be from one *particular* degree of heat to another, as shown by the thermometer. It is not uncommon for several weeks together in the interior parts of Africa, for the temperature of the atmosphere to be at 130° of Fahrenheit's thermometer, and a person to be brought from that heat suddenly to one of 100°; which the author believes would be sufficient exposure to cold to produce fever; (although he has no instance of this having actually happened; there having been very little intercourse between this country and that part of Africa, or any other where the heat is continued, of any thing near that temperature, for any considerable length of time.)---The instances are numerous, in places where the heat is 100°, of fever being produced (as well as other diseases) by a sudden diminution of heat to 80°; and the author has known instances of fever produced by going suddenly from an heat of 60° to 40°.

Sudden exposure to a colder medium is apt to produce many diseases *besides fever*.---It would seem that a sudden diminution of the temperature of the medium, to which a person is exposed when the thermometer shows an *high* temperature of heat; is most apt to produce fevers: and this seems to be one cause why fevers are more frequent in *warm* than in cold climates:—the sudden diminution of the heat of the medium being more apt in *colder* climates to produce catarrhs, rheumatism, &c.—Why this happens is not attempted to be explained; as it is meant in this treatise to adhere entirely to a relation of observations and experiments.

Supposing a person were to pass through a column of a warm atmosphere not an inch in thickness, and immediately again into an atmosphere of the same temperature he was in before; undoubtedly no fever would be produced. It is necessary, therefore, that he should *remain* some time in the warm atmosphere, before his going into a cold one is sufficient to produce the disease.—The heat of the atmosphere must put the system into some *state*, that the sudden exposure to cold may act upon it; so as to occasion the disease.—The obvious effect of remaining in the *warm* atmosphere, is the production of a greater circulation in the exterior parts of the body, greater evaporation into the atmosphere, and a greater exudation from the skin. The obvious effect of exposure to *cold* is, to produce contraction of the exterior vessels; (of course to cause that a greater quantity of blood should be contained in the interior vessels;) and that there should be less evaporation from the body generally, and less or no exudation from the skin.—*Sudden* or *slow* exposure to cold [will not] produce these effects equally: therefore it cannot be from the simple contraction of the exterior vessels, the simple diminution of vapor rising from the body, or the simple diminution of the exudation from the skin; that the mischief arises. It is certain, that gradual diminution of the medium has never been observed to produce fever, or indeed any other disease.—All other conjectures about the mode of sudden exposure to cold producing fever, are so extremely nugatory, as not to be worth the least notice. That checking the insensible perspiration, or producing contraction (which has been called spasm, or by any other term), is the reason why sudden exposure to cold produces fever, has been much received; and, perhaps, might require fuller discussion, were it not that contraction and obstruction of the insensible perspiration, may be equally produced by slow, as by sudden exposure to cold; and without any mischief; which the author thinks sufficiently refutes this doctrine; (especially as, when a fever is actually produced, it is entirely independent of its cause.)

All the advantage which arises from the knowledge of causes of fever, is only applicable to the *prevention* of the disease. This accounts for the slovenly manner in which authors have treated of its causes.

In order that sudden exposure to cold should produce *fever*, it is not necessary that the *whole of the exterior surface* of the body be exposed to it. It is sufficient that a cold substance be applied to part of the surface; or that a cold fluid should be thrown into the stomach.---It must be observed, however, that although there are many instances of cold applied partially, or of a cold fluid thrown into the stomach, producing fever; yet a *partial* exposure to cold is *more frequently followed by other diseases*, especially *internal* inflammation, (as pleurisy, &c.): and farther, sudden exposure to cold is followed, perhaps an *hundred times or more* by other diseases, for once that it is followed by fever.---If a man when *fatigued*, is suddenly exposed to cold; the exposure is much more frequently followed by disease; and particularly by fever. For example, if a man has been in a crowded assembly, where his attention has been strongly excited, and comes suddenly out into the cold air; or if he has been fatigued by exercise, and should throw himself into cold water; there are many instances of fever having immediately ensued. It does not appear from any well attested evidence, that fatigue increases the powers of any of those *substances* which (floating in the air and being applied to the body) give occasion to the disease.

The next cause to be taken notice of is *Moisture*.---A man going into *water* of a moderate temperature, and remaining in it for some time; has not been found more frequently afterwards affected with fever, than after standing, walking, or any other indifferent circumstance: It is certainly therefore, not the application of water to the body that gives occasion to the disease.---But if the *Air* has particles of water floating in it, and a man has continued for some time in such an air; fever has ensued much more frequently than when he had lived in a dry air.

It is to be observed, that water may be in air in *three different ways*.

First, small particles of water may be *suspended* in the air like any other matter reduced to very fine particles; for, although water be of greater specific gravity than the vapors which form the atmosphere; yet many other substances of much greater specific gravity than water are frequently seen suspended in the air.---This is easily demonstrated by allowing a small portion of the rays of the sun to pass through a small hole into a darkened chamber; when these particles are at all times easily discernible. --The air, although of small specific gravity, is exceedingly *viscid;* and, therefore, if particles of any matters are blended with it by any power, they will fall down very slowly; or if there be any agitation, their fall will be altogether suspended; (and the atmosphere is almost always agitated with various currents). A solution of gum arabic in water is not of much greater specific gravity than pure water; but while small particles of sand, clay, &c. sink readily in pure water; they will be suspended a long time in a solution of gum arabic; in which, if there was any considerable agitation they would not sink at all.---It is not necessary to say how these small particles of water are thrown into the air. When these particles are found in the atmosphere, they possess all the properties of water; moistening substances, so as to lengthen or shorten them according to their texture; and the quantity of the particles of water may be ascertained in some degree by an hygrometer, (an instrument commonly measuring the lengthening and shortening of substances as depending on moisture).

Secondly, of the vapors which constitute the atmosphere, some one or other or all of them are capable of *combining with water chemically;* so that the properties of these vapors and of the water are lost; and the water so combined does not affect substances so as to lengthen or shorten them, nor does it disturb the transparency of the atmosphere; (which water, suspended in the atmosphere in the manner first described, does; as is often extremely sensible to the eye without any aid; but much more perfectly, if the objects are viewed at a distance through a telescope of great magnifying powers.)—If the atmosphere is hot or dense, it is capable of combining chemically with a larger proportion of water. If it should be saturated with water therefore, in any particular degree of heat or density; and if the heat or density should be diminished; it is separated, and mixed with the atmosphere in the first manner; as is easily observed. If the weather should become suddenly very warm; and the heated air should be made to pass through a large building, the walls of which have not had time to acquire the heat of the atmosphere; the water is not only condensed upon the walls; but the atmosphere of the building loses its transparency, and appears very moist by the hygrometer.

Thirdly, if the vapors constituting the atmosphere should be heated to a degree *equal to that in which water boils*, (which degree differs, according to the pressure on its surface); in that case, after the atmosphere had dissolved as much water as would saturate it, the remaining part of the water would not be in small fluid particles; but in the form of *vapor;* and would mix with the other vapors of the atmosphere, exactly as *they* are mixed with one another. As soon as the heat should be so diminished, as to be less than that at which water would boil with that degree of pressure; then the water would return to its fluid form; and be suspended in small particles.

Of these three different modes of suspension of particles of water in the atmosphere, the *first only has been called moisture;* and it is this only which has been found to occasion *fever.*—It is true, that if water be contained in the atmosphere in either of the other states; it may easily be *reduced to this* by the means that have been already stated.

Some have contended, that the application of water suspended in the atmosphere in the form of moisture does not produce fever. If those who have held this doctrine were to live a year or two in Batavia, they would be convinced, by fatal experience, that men living in a moist atmosphere are more frequently affected with fever than in a dry one.

Men wearing any moist covering have been more frequently affected with fever, than those who have worn clothes not moistened with water. Vast numbers of men have worn moist clothing, and have lived in moist atmospheres, without any fever having taken place immediately afterwards.—Hence, many have conceived that these are not causes of fever.—But the many observations of men being immediately seized with fever, (as well as other diseases,) after being exposed to moisture, more frequently than those who have worn clothes free from all moisture, (the other circumstances being the same) which have been both recorded in the annals of medicine, and have come under the author's inspection; give as full evidence that moist clothes are capable of producing fever, as any that can be generally procured with regard to the causes of diseases.

The frequency of fever immediately following a person's having been covered with moist clothes, is not the same indiscriminately, whatever *substance or texture* they are of.—There are some substances and certain textures which *conduct* heat and cold more or less readily; that is, on being brought near an heated body, they receive heat from it more readily or more slowly. A piece of lead, for instance, placed near an heated body, will acquire the heat of that body sooner than a piece of chrystal; or its cold, if it be placed near a cold body; (all other circumstances, excepting the species of matter, being made equal.)—Wool, although the substance be the same, if it be wove into a *loose* cloth such as flannel, will become hot or cold more slowly, if it be brought near an hot or cold body; than the same wool wrought into a cloth of a *firm* texture, such as camblet.—If men are covered with substances, which either from their species or texture receive heat or cold more quickly; and these substances are moistened with water; fevers will more frequently ensue, than if they were covered with substances that receive heat or cold more slowly.

Moisture in the air, or of the coverings of the body, produces more fevers, the *warmer* the atmosphere.—But moisture produces fever in *all* temperatures.—The Dutch have endeavored to make the country of Batavia resemble Holland in the immense number of its canals. The consequent moisture of the atmosphere is very great in both places; but, although fevers therefore frequently occur in Holland, they bear no comparison in number to those which happen in Batavia; where the fatality (owing to the *moisture and heat* of the climate) is so great, that it is wonderful any person should ever approach that settlement, but from the absolute impossibility of otherwise obtaining water or food.

When the *air is moist* in consequence of *water evaporating from a marshy country, or from canals* (in which the water is stagnating or moving with a very slow motion;) fevers more frequently arise, than when the moisture proceeds from the *sea, large lakes, or rivers* confined within their banks and running with a considerable degree of rapidity. (While fevers are frequently produced in the fens of Lincolnshire, few arise on the banks of the Thames.)—This has given occasion to suppose that some *other* vapors proceed from such marshes, *besides water;* and produce the disease.—It certainly happens often that a considerable degree of *putrefaction* takes place in marshy grounds, and more especially in warm climates; but it is by no means to be concluded, that moisture in the atmosphere always produces fever in consequence of putrefaction. Putrefaction can only take place in animal or vegetable substances: If water, therefore, not impregnated with either, should be in such a situation as to produce moisture in the atmosphere, no putrefaction can take place: therefore, if fevers ensue, they are certainly in consequence of *moisture*, not putrefaction.—Many instances of this may be brought; as in the war which took place in Flanders between the years 1710 and 1711. An army, encamped upon a pure sand in which water was found in digging less than a foot deep, and occasioned a great moisture in the air; exhibiting in a few days numbers of fevers, although the army was perfectly healthy before: and no more fevers were produced on shifting their ground. There are a vast many other instances of the same thing having taken place.—Besides; fever has often arisen immediately in persons sitting in rooms, the floors of which had been just moistened with pure water.—Although therefore substances arising from putrifying animal or vegetable matters, in marshes or other stagnating waters, render the vapors arising from them *more dangerous;* yet it does not follow from thence, that the particles of the water forming the moisture of the atmosphere may not of *themselves* be the cause of the *Disease*.

Another idea suggests itself; that since water being applied in a mass, (that is to say, if a man immerses the whole, or any part of his body in water of the temperature of the atmosphere, in which he remains for some time; or if he throws water of such heat into his stomach;) no disease ensues: and since water in small particles in the atmosphere applied to the body, is of the same heat with the atmosphere, and is often applied to parts of the body only, and still produces fever; it cannot be the mere application of the particles of the water that produces the disease: it must therefore be something that they *apply to the body*, which occasions it.—What this may be is not very clear.—As evaporation of water into the atmosphere produces cold, and solution of water in one or all the vapors which constitute the atmosphere likewise produces cold; some have conceived, that it is the production of cold which is the cause of the disease; and that, therefore, moisture may only be a means of suddenly applying cold to the body, (and that the effect of moisture is to be ascribed to cold.) But this the author leaves to future experiment and discussion.

The next cause producing fever is *Eating certain food.*

Putrid and infectious substances applied to the *body*, (as has been already described,) may either produce a fever immediately upon their application;—or the body may be in perfect health for some time afterwards, to all external appearance, before the disease comes on:—But when fever is brought on by *cold or moisture*, the author has already stated that the disease takes place *immediately*, (that is to say, either a complete paroxysm of the disease, or some of the symptoms of the first stage, are very sensible, and continue; until in a short time afterwards they spread over the whole body, so as to constitute a complete paroxysm.)—The same thing is to be observed with regard to *Food;* for there is no species of food eaten, which, *after* it has gone through the digestive organs, has been found to be followed by fever.

When food, therefore, is the occasion of fever, it is by its *action upon the stomach, or other organs of digestion.*

Food of *difficult digestion* produces undoubtedly a variety of different diseases; of which however, fever is seldom one: (the author has never seen it, excepting in one case.)—But when a person has been afflicted with fever, and recovered from it, (either by a spontaneous crisis, the disease going through its ordinary course, or by medicinal application); if soon after he should make use of food too difficult of digestion for the powers of the stomach, (which have been generally weakened by the disease;) a *new attack of it* has taken place *immediately*, and before the food had passed through the stomach.—Indeed, eating food difficult of digestion, soon after fevers go off; seems to be one of the most frequent causes of the *reappearance* of the disease.---In a person who has not lately been affected with fever, purgative medicines have never been observed to have been followed more frequently with fever, than in persons who had not made use of any such medicines; but when a person *has* been lately afflicted with fever, which has been carried off, (either by an ordinary crisis or by medicines,) it has often happened that a fever has returned on using a purgative medicine.---This fact which is applicable principally to intermittents; is also true (although it seldom takes place) in continued fevers.

A sudden excitement of any of the *Passions of the mind*, attended with great *anxiety*, has been immediately followed in some cases with fever;---yet these are so few as to render it doubtful: because some of the causes of the first set before described, (which do not produce the disease immediately upon their application,) might have been applied; and an impression made by them before the passion was excited, has brought the fever *at the time it arose*.---Yet very immediate attacks of a complete first stage, or cold fit of the disease, having happened on the excitement of such passions; renders it extremely probable that this is likewise a cause of the disease.

These are all the circumstances that have been observed, to which persons having been exposed, fevers have afterwards more particularly taken place in them.

All the causes, therefore, to which fevers can be ascribed from *observation*, are: Certain substances applied to the body, as floating in the atmosphere, or applied in a fluid form to some part of the body: Sudden exposure to cold: Moisture in the atmosphere: Moisture of the clothes, or other covering of the body: Indigestible food, or other substances affecting the intestinal canal: Sudden rising of the passions of the mind, attended with anxiety.

But it happens frequently, that fevers arise without any of these circumstances having been known to precede them.

It is true that many of the circumstances may have taken place, without either the person in whom the fever arose, or any by-stander observing them.---Since the infectious matter, for instance, rising from a person affected with fever, has no smell, nor taste, nor other sensible quality; a man may chance to come near another from whence this substance is rising, without observing it; and having received the infection may remain in perfect health for a fortnight, or three weeks; when an attack of fever may suddenly take place, without the patient himself or any other person being able to imagine, from any evidence, that it was in any manner owing to this cause.---This is not so much the case with exposure to cold, or any of those causes, which bring on fever *immediately*, (or not at all.) Even if it were; fevers arise so often without our being able to make out that the patient has been exposed to the causes which have been enumerated; that there must undoubtedly be other causes than these, which give occasion to the disease; but which are at present totally unknown.

It may not be improper to consider some of these *Causes* that have been *supposed to operate.*

Eating *food of particular kinds* has been thought by some to give occasion to the disease. It has been already noticed that eating food of difficult digestion has often evidently produced relapses in fever, but hardly ever a fever originally; and that, only while it remained on the stomach.---Various nations live on various kinds of food. The Bramins eat vegetable food alone; many of the Laplanders animal food only; the inhabitants of some countries live on grain; of others on fruits: yet if all the other circumstances be the same, fevers are not more frequent in one of these descriptions of men, than in the others.---Instances there are very frequently in this town (London) of eating too large quantities of food, and that of very difficult digestion; but fever is not the disease that follows more frequently than in those, who have eat food in smaller quantity or more easy of digestion. The author has shown, in another treatise, that whatever be the food, the fluids produced from it are the same.* ---Those who have believed that eating food of any quality or in any quantity, produced fever; have formed the opinion upon mere conjecture, and not accurate observation.---It is true that a man who has already had a ground of fever, may have that fever come on immediately after eating food in too great a quantity, or of too difficult digestion. A man may have received the infection of the small-pox without any external or apparent symptom; and the fever may have arisen a few hours after he had gorged himself with turtle and venison; but this fever certainly is not to be ascribed to the food.---So it might be with any other infection or cause of fever, that did not immediately bring on the disease. It requires a frequent succession of one event to another, before one can be considered as the cause of the other.—Unfortunately too much stress has been laid upon single observations in medicine.

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* See the author's *Treatise on Digestion.*

As men accustomed to wear moist clothes, by habit acquire an indisposition to have disease produced in them by wet clothes; while those unaccustomed to such covering would be readily affected by the same circumstance; so it may be thought, that a man used from his infancy, to eat any particular species of food, might acquire a habit which would prevent him from being affected with disease in consequence of it.—And certainly this is the case with respect to many diseases:—for a man who has been accustomed to live on animal food alone (often even in a putrid state) has been found not to be affected with what is called sea scurvy, (or a tendency to putrefaction of the fluids); while a man who had lived on vegetable food entirely, if he had used animal food only, would undoubtedly have been afflicted with that disease in many instances.—But although there be numberless instances of men changing their food from one species to another; yet there is none the author knows of, in which *fever* has arisen more frequently, all other circumstances being the same. Excepting when food, by its action, while it is in the intestines, produces fever, (which happens rarely); and excepting in convalescents from fever; there is no ground to believe, that the use of food of any kind is a cause of this disease. After food has passed the organs of digestion, there is therefore no reason for believing that it is the cause of fever.

The *States of the Fluids*, (that is, the properties of the different species of fluids contained in the body, or their proportions,) have been thought by many authors to be causes of fever; such as their vicidity or thinness, their acrimony or mildness, their different proportions to one another, their putrescency, &c.—The properties of any species of matter can only be known by experiment. It could not be known even that water is capable of fluidity, to one who was conversant only with eternal ice. Whatever therefore was said with regard to the fluids of the human body, before experiments were made to ascertain their properties; must be passed over in oblivion. Every thing therefore that is said with regard to the fluids before the time their properties were investigated by experiments, (excepting some of the external appearances of some of the secreted fluids,) is to be entirely passed over; as not at all relevant to any explanation of the causes of this disease, or the history of it, in any manner.

The first part of the blood which was distinctly marked, is the serum: Leeuwenhoek, or some person about a century and a half ago, discovered the red particles: Even Boerhaave was unacquainted with the coagulable lymph. And the properties and varieties which take place in these three essential parts of the blood, are even now not well known to the majority of practitioners in Europe.—It would appear therefore, that there is very little ground for resting the causes of disease, (whether it be fever or any other,) on what has been affirmed of the properties of the fluids by many, even practical authors; for they knew them not, and did not examine them.—The author will venture to affirm from many experiments, that the fluids being in *any* state of all those varieties which are known, (the other circumstances being the same,) fever will equally take place.—One state only shall be specified which has been laid down by some great practical authors, (such as Sir John Pringle,) as a cause of fever; viz. putrefaction of the fluids. Now we know that the blood in that disease, which is called the sea scurvy, frequently verges so near to putrefaction; that the red globules are broken down into smaller particles, and the coagulable lymph and serum hardly coagulate by heat; yet fevers never arise here from putrefaction.—Frequency of the pulse and various other affections of the system undoubtedly arise, and have been called fever; but are by no means that disease meant by Galen and other Greek physicians, (if we may call Galen a Greek,) Lommius, and many other modern practical authors; and which the author is describing. There is then no ground from experience to believe, that any particular state of the fluids is followed by fever, more frequently than any other state, (all other circumstances being the same.)

It has been already observed, that some of the causes of fever do not occasion it to come on immediately; it being often many days after their application before any symptom of it takes place.—In the small-pox, when caught from variolous matter floating in the air; there is no experiment or observation, on which we can depend, to illustrate what happens in the system between the application of such causes, and the coming on of the disease. But the mind of man, when it cannot find causes from industrious experiment or slow observation; takes them from imagination; and more especially in medicine, which has been considered as a divine art and springing from inspiration. Many men therefore have believed that physicians could divine every thing relating to it; and this, (although by no means consonant to the reasoning in the other arts and sciences possessed by mankind,) has even entered into the minds of practitioners themselves. Many instances may be brought from the ancients; many from the ages of magic and romance.---Nor has this idea subsided in modern times. The author has heard Dr. Fothergill and others state (in serious harangue) their inspiration not only in the knowledge of diseases, without inquiring into their external appearances; but that prescriptions have flowed from their pen without any previous composition in their mind: and this they have affirmed, not in compliance with the prejudices of patients, but from their own belief.

Many authors have laid down, that when the causes of a disease, especially fever, are not followed immediately by disease, but several days after; that that cause has produced some *alteration* in the proportion of the blood, or some of the other fluids, which is the occasion of the disease. The knowledge of medicine however, like that of all other sciences and arts, is only to be acquired by experiment and observation; and neither experiment nor observation has shown that any of the essential parts of the blood have been at all altered in their properties; (or in other words, that the blood has been at all altered in its properties from the time of the application of a cause of fever not acting immediately, to the time of the disease taking place).---The whole experience of any alteration is in the inoculated small-pox; in which a small part of the matter of a particular and small part of the body is converted into variolous matter; which being absorbed, produces the disease immediately. There is no reason, therefore, from experiment and observation (consequently none whatever,) for believing, that fever is ever brought on from any alteration of the quality of the fluids contained in the blood-vessels, produced by using any kind of food or by any other means whatever; notwithstanding the opinion so universally brought forward by authors on this subject, that there is.

Of the particular secreted fluids which have been thought from their redundancy, or alteration of properties, to be causes of fever; *Bile* has been the most frequent.---The ancients, (whose knowledge of the properties of the matter of the body was very superficial, and depended solely on the external view of the body, on which they founded their hypotheses,) supposed that the fluids consisted of red blood, phlegm, bile, and black bile; (as is well known to those who have looked into their writings;) and that to a redundancy or alteration of the qualities of these, diseases were principally owing: and this idea has continued down to the present day.---Bile is remarkable from its color and taste. Its color is varied by substances that it meets with in the intestines. This difference of appearance has made it to be still considered as of great importance in disease.---But modern inquirers have shown that it is a fluid secreted only by the liver; and not at all contained in the blood-vessels; but formed out of the substances which constitute the blood. There cannot, therefore, be any redundancy of bile in the blood-vessels; because generally there is no bile contained in them at all.---Bile may however, and sometimes does, get into the blood-vessels. When it does, being capable of passing through all the secretory organs, it soon shows itself in all the secreted fluids; by giving them a color, and converting them into a yellow dye; and by tinging all the surfaces of the body, that are exposed to the eye, of a yellow color.---When this happens, *fever* is never known to be produced, or to have followed or taken place, more frequently, than in any other state of the body.---Bile, therefore, when it does get into the blood-vessels, never can be accounted a cause of fever.

When the secretions of those glands which open into the intestinal canal are increased from any cause, the secretion of bile is increased; along with that of the pancreatic juice, mucus, &c. When these increase considerably, they are evacuated upwards or downwards.---Bile being the only remarkable one, from its color and taste, has often been attended to; while the others have been neglected. There is no evidence that in these cases the liver secretes a larger proportion of bile, than the other glands of the intestines do of their fluids. However this may be, *apparently* there is a great quantity of bile thrown out.

There are no instances upon record, nor any the author ever knew, where *fever* more frequently took place after such increased secretion and evacuation; than in any other circumstance.---In that sickness, for example, which is produced by the agitation of a ship, vast quantities of bile are often secreted, and evacuated; yet there is no instance of fever having taken place in consequence; therefore bile getting into the blood-vessels, or being secreted copiously, cannot be admitted as a cause of fever.—When so much has been said by many authors of great eminence about bilious fever; is their authority to be thrown aside entirely? Certainly: no authority but that which rises from observation and experiment can ever be allowed in true science.—It would be a great pity to rob patients of their consolation in being bilious or nervous; but medicine is a science which never can be comprehended without much study; considerably more than can ever be given to it by persons following other occupations.

Another cause of fever frequently referred to is *Heat.*—Heat may be considered in two lights; one of which refers to the atmosphere or hot medium, in which a man lives. Among the inhabitants who live in those regions of the earth, where the heat of the atmosphere is great, undoubtedly many more fevers take place, than among the inhabitants of those countries where the heat of the atmosphere is less.—It is by no means proved by this, that the heat of the surrounding medium occasions fever; for it is to be observed, that in warm climates, where there is *no moisture* in the atmosphere from stagnating waters or other causes, fevers do not arise more frequently than in colder regions.—In Egypt, where the Nile overflows its banks; with fertility to the soil, it gives moisture to the atmosphere; which is frequently the cause of fever. The same thing happens from the overflowing of the Senegal and Gambia, on that coast of Africa which borders upon the Atlantic Ocean. In the Isthmus of America, when at particular times of the year there are great falls of rain, fevers take place frequently: and so it happens in the rainy season in all other hot countries.---Where hot countries have been overgrown with woods, filling the air with moisture, fevers very frequently arise; but when the country has been cleared, and the air by that means rendered dry, these fevers have diminished in proportion to the cultivation; as in the case of those parts of the sugar islands lying on the east coast of America. In America, and the islands in the Pacific Ocean, which are neither subject to violent rainy seasons, nor kept moist by stagnating water or close woods; although the inhabitants are numerous, fevers are not prevalent. The countries which lie to the north of the Cape of Good Hope, in Africa, are the hottest on the earth; Fahrenheit's thermometer having been often in the shade, or even in the night, not less than 115° for six weeks together: but being likewise dry, fevers are not prevalent.—Artificers employed in trade, where they are often for many hours in an atmosphere heated to more than 150°; are by no means particularly affected with fever.

Fever has never been observed to arise in those who have used a warm bath; nor were the baths of the ancients, (though they remained a considerable length of time in air heated to a great degree,) ever observed to produce the disease.

The remaining, therefore, in a warm medium, a shorter or a longer time, cannot by itself be admitted as a cause of fever.

When a man remains for some time, (that is to say, from a quarter of an hour to two hours,) in a very great degree of heat above the common heat of the atmosphere of the country where he lives, (as in England, in an heat of 120°, 130°, or 140°, or more;) the pulse beats quicker, to perhaps 120, 30, 40, or 50 strokes in a minute. The whole circulation is increased, not only in rapidity, but force; and this force of circulation subsides very gradually afterwards, although a man goes suddenly into a much colder medium. The Russians, for instance, from what they call the warm bath, (which is remaining in a chamber in which the air arises moist,) are heated often to more than 140°; yet plunge themselves into water nearly at the freezing point, or even into snow, without fever or any other disease ensuing.—It might be imagined in this instance, that disease is prevented by an habit from infancy; but the author has had experience of many persons coming out of mediums, heated to as great a degree, without any disease whatever having taken place; although they exposed themselves suddenly to cold in such a manner, that on this supposition, many of them must have fallen into various diseases, when they had remained for an unusual length of time in a chamber heated to 80°, or 90°, and then exposed themselves suddenly to cold.—The author does not mean here to attempt an explanation of this fact;---he only observes, that the difference, when the appearances take place is, that in cases where a man has been in a considerable degree of heat for a great length of time, and suddenly comes into a colder medium; the exterior veins continue turgid; and the skin feeling warm to the person himself, remains of a florid color, and not contracted: whereas, when a person has been in a more moderate degree of heat for an equal length of time, and comes into a colder medium, the exterior veins disappear, the skin contracts, coldness is felt in a great degree, considerable paleness appears on the body, and the skin sometimes assumes a livid hue.*

Many *other* causes of fever have been assigned; but with so little foundation that they are not worth noticing here. Neither is it worth attending to the infinite quantity of absurd assertions that have every where been made in medicine, unsupported by observation, (which is the only evidence.)—Who would make an experiment upon men, which would determine whether any application would produce a fever or no? and the diseases of brute animals, as well as their whole economy, are so different from those of the human body, that no conclusion can be drawn from the one to the other. This is a maxim the author's experience has shown him to be perfectly true.

The next point to be examined in treating of the causes of fever is, *whether they are capable of co-operating with one another.*—This is a point very difficult to ascertain; particularly as all the causes of fever that we know, are frequently applied under apparently the same circumstances, without producing the disease. The evidence is so incomplete, that the author dares not venture to make any conjecture on the subject.

The next consideration with regard to the causes of this disease, (although the author has treated it in a paper already published, in the first volume of the Medical and Surgical Transactions,) would be improperly omitted here.---If a body be put in motion by an impulse, and no resistance be made to that motion; it will continue to move on, in the same manner, (i. e. in the same direction, and with the same velocity,) although no new impulse be made. In like manner, *if a fever be produced by any cause, it will continue; although that cause is no longer applied.*---This proposition, as far as the author knows, has not been produced by any writer on this disease: it is therefore brought forward with great diffidence.---On the contrary, it has been laid down by Sydenham, very distinctly, (as well as by almost all the authors who have treated this subject, both ancient and modern,) that the original cause of the disease is constantly acting to keep it up. Sydenham, (as well as various others) has said, that some noxious matter gets into the body, exciting certain movements, which he calls concoctive; by which this matter is destroyed and thrown out of the system.---It is true, indeed, Van Helmont supposes that there is a kind of spirit; which, however, is to be overcome and expelled:---and Dr. Cullen, that a spasm is induced; without entering into any consideration whether the spasm, whatever it might be, requires its cause to be constantly kept up or no.

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* The author's statements are entitled to notice on this subject, since it is to him that we were first indebted for the celebrated experiments made on the human body, by means of heated rooms. Dr. Currie also leads us to conjecture, that if a cooling process be applied to the whole body after it has been heated, it is important that the heat should have been so great, as that the means employed in the first instance for reducing it, shall not bring its temperature below a certain standard.

The point to be determined is, when a cause of fever has been applied to the body, and has produced the disease; whether the disease will go on, if the cause be entirely removed; or whether it requires the constant application of the cause for the continuance of the disease.---The author, (on considering the history of the disease, both as it has been laid down by writers who have frequently seen fever, and who have related particular cases of patients afflicted with it, or its general history as deduced from their observations and as he has learnt from his own experience,) is clearly of opinion that a fever once produced *will go on;* although its cause be entirely removed: just as a body put in motion will continue in motion, (although the impelling body be entirely removed,) if it meet with no resistance.---That is; he is clearly of opinion that if infectious matter of any kind be applied so as to produce fever; the fever will go on, although the infectious matter be entirely removed, (so that no particle of it is either contained in the body, or touches it externally:) that if any passion of the mind, attended with anxiety, produces fever, the fever will go on although such affection of the mind be entirely removed: that if fever should be produced by a sudden diminution of heat in the surrounding medium, supposing that the body is afterwards kept in a medium the temperature of which is perfectly uniform, and of any degree of heat, the fever will go on perfectly: that if fever is produced by moisture in the atmosphere, it will go on if the patient is afterwards kept in a completely dry atmosphere: that if fever is produced by putrid matter applied in any way to the body, the fever will go on if no putrid matter of any kind is contained in or afterwards applied to the body.---Each of these positions ought to be proved by great numbers of particular instances adduced; but relating the observations that have been made by practitioners, on this subject, as well as those which have occurred in the author's own practice, would render this work much too voluminous.

The next point to be observed in the action of the causes of fever is still more removed from common opinion---If a *body be put in motion* by any impelling power, and meet with no resistance after having received the impulse; it will continue its motion forever with the same velocity in the same direction. But if the same impelling power should be applied to it a *second time* in the same direction, the velocity of its motion would be *increased* in that direction; and every time this is repeated, the velocity of the motion in that direction would be constantly increased; (and if any other impelling power should be applied in the same direction, the velocity and motion would also be increased in the same direction.)---Therefore in fever, if a cause be applied so as to produce fever; by analogy we should expect that the same cause being again applied should increase the disease; or that any other cause of fever being applied should also increase the disease: (and so it has always been taken by authors.)---As the author has already said in the paper before alluded to, having by accident in inoculating for the small-pox, made a puncture one day that he was not sure was sufficient to produce the disease; a puncture was made in the same patient a day afterwards: each puncture producing an inflammation which came to suppuration. Although fever was produced when the first inflammation came to suppuration, when the second came to suppuration, no *increase* of fever took place;---and it is farther observed in that paper, that the *natural infection*, as it is called, of the small-pox requires generally thirteen or fourteen days after it is applied to produce the disease; while, if the matter be applied to a *wound*, (as it is in inoculation) the disease takes place in seven or eight days after the matter is applied.---If, therefore, a person has caught the infection of the small-pox in the natural way, (that is, by the matter floating in the air being applied to some part of the body); and if a wound be made two or three days afterwards, and variolous matter be applied; the fever will be produced in consequence of matter applied in the natural method; and no additional fever, (if one was already present,) will take place; nor will any fever come on, if it has gone off.

Again: (since the causes of fever are frequently applied to persons in health, without producing the disease;) a question arises if in any given number of persons *affected* with fever, and an equal number of persons *not affected* with fever, any cause of fever should be applied; whether in the persons *in perfect health* that cause would produce fever more frequently, than it would produce a new fever in those, who have been *already affected* with the disease; or would increase the fever already existing?---By analogy from the common incident of life, one would immediately conclude that such cause of fever *would* readily increase one already existing; and would equally, or more readily produce a new one.---But observation, not only in the infection of the small-pox, but in other cases, contradicts this idea.

In order, however, to investigate this point, two things are to be considered.---In the first place, *whether two fevers can be present at once?* or whether one fever only?---To those who are conversant only with those authors, who have written from their practice since the revival of science in Europe, and have not grounded their arguments on the writings of the Greek physicians, (among which the Author includes likewise the Arabian, and a few Roman practitioners;) this may seem a question not to be worth considering; yet the Greek authors, who are extant, describe diseases in most cases with greater precision than the modern Europeans; and it was with them an universal and decided opinion, that two fevers might exist at once.---The proposition, therefore, to be recurred to is, whether a fever being once produced; a new cause, or a repetition of the same cause, is more likely to produce a second fever or an increase of a fever already existing; than to produce a fever in a person in perfect health.---In the small-pox, new variolous matter applied after a fever has been already produced, will neither produce a new fever, nor increase that which has taken place; and farther, when it has once produced a fever, it is never capable of producing another. The author has applied variolous matter to wounds in himself and many others, who have once been affected with the fever produced by this cause; without any new fever arising; although inflammation in the wound has taken place. The same is true, when fever has been produced by any other particular species of matter, applied any how to the body.---When such inflammations have taken place on the skin, and matter has been formed; this, applied to a person who never has been afflicted with a similar fever, followed by such eruption, is capable of producing the disease.

When peculiar kinds of matter have been formed in the body (but not in consequence of *inflammations of the skin)* capable of producing fever when applied to a man in health; such matter after having produced one fever, may produce a second, third, or fourth in the *same* person.---For example, when the common infectious matter produced in the bodies of all persons affected with fever, has once produced the fever; and the patient has gone through the disease and recovered: by a fresh application of the same species of infectious matter, a *second* fever may be produced in the same person; (as almost every practitioner who has seen a great number of patients, must have found from his experience.)---But in the first place, if that infectious matter which is produced in the bodies of all persons afflicted with fever, has produced the disease, (according to the author's observation, as well as that of many other authors who have frequently seen the disease,) the repeated application of such infectious matter *neither increases the disease*, nor brings on a new fever *nearly so often*, as it originally produces a fever in a man in perfect health.---The proof of this is shewn from the following circumstance. In hospitals, where persons ill of other diseases have a fever produced by such infectious matter; when they remain in the same ward where they received the infection and where they are constantly exposed to it during the progress of the disease, (it arising from several other patients, in the same ward); they go through the disease exactly with the same circumstances as those, who have accidentally received the infection, and are in large rooms where they are exposed to no other infectious vapors than those which arise from themselves.---Every practitioner conversant in fevers that have taken place from *infection*, (such as are produced by fever, in the higher and lower ranks of life,) will be perfectly convinced, upon reflection; that a fever taking place from infection in the most wealthy and noblest persons in the country, and treated with all attention, with regard to infection; goes through its course in the same manner, as in a patient in an hospital where there are many others afflicted with the same disease; provided that attention is paid that there shall be an equal change of the air of the atmosphere, and freedom from putrefaction.

It follows, therefore, that when matter which produces fever followed by *cutaneous eruptions* has once been applied to the body, so as to produce the disease; a second application of it will neither

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[illegible] the appearances lower-
[illegible] the first and subse-
[illegible] depression of strength, con-
[illegible] the stomach.
[illegible] sometimes kills in less than five
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[illegible] with great sense
[illegible] become very cold, and per-
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that *this frequency is not a symptom necessary to constitute fever;* (for if a disease should kill without a particular symptom, that symptom undoubtedly cannot be essential to the disease.)

It is rare, however, that fever is fatal in its first attack.---It has been already shown, that its continuance does not depend upon its original cause: it must therefore have some progress *of its own;* either it must remain exactly in the same situation in which it was produced, or some variation must take place in it.---It is true indeed, that if the subject be taken *a priori*, it would *prima facie* be concluded, that if a cause produced an effect, and was no longer applied; that that effect would continue precisely the same.---But this is not the case with the human body. There are *powers in it* which retard or repel those variations that are produced by the causes of disease; and so it happens in fever. There are powers in the body, which when the fever is once produced, repel it, and bring the patient back again to the healthy state.---It is very true, that what these operations are which repel fever, is not known, (as far as the author is able to judge;)---but the *external* appearances which take place during their operation are perfectly known.

The author has therefore only to *enumerate* the appearances which take place during the time that the powers of the body are repelling the *Attack* [or First Stage] of a fever, from whatever cause it may arise.

The first of these are *Horror and Rigor;* in English shuddering and shaking; (although the Latin words express the sense better.)---It is an observation the author heard from Dr. Cullen, which has been confirmed from his own experience and reading; that when in any paroxysm of fever, *rigor and horror take place; the patient is never carried off by the accession of that paroxysm.*---Many observations are however to be made with regard to these symptoms. They are very far from always taking place in *every* fever; so as to be sensible either to the patient or the by-stander, or to a practitioner well versed in the disease. When they do take place, they happen very commonly in the first accession of a *continued* fever; not so frequently afterwards. They take place oftener in the subsequent accessions of *intermittent* fever; but are very far from being constant in them: (and although it be true, that when they do take place, the patient is not destroyed in that paroxysm by the fever itself; yet it is also true, that many patients escape during the accession of a paroxysm, without any horror or rigor taking place.)

It is hard to be ascertained, to what *part of the body* an *affection of* the horror and rigor are to be ascribed.—Sensations are generally felt in that place where the cause of the sensation exists; but this is by no means an universal rule. There are many sensations which are felt in parts of the body different from those where the application is made (as pain is felt in the forehead, for example, when substances are introduced to the stomach which disagree with it).—It is moreover difficult to judge from whence this horror and rigor arise. The author's own feelings lead him to suppose, that they arise from affection of the stomach: he does not however mean to insist upon this.—As rigor and horror are sometimes absent, so they take place in various degrees. Sometimes the external parts of the body are much affected, and considerable motion takes place in them, (and especially in the extremities) in consequence of alternate contraction and relaxation of the muscles: sometimes the other moving exterior parts of the body are put in motion; sometimes, although all the external parts are at rest, contractions and relaxations of the interior parts take place, which patients express by saying they shake inwardly. In which ever of these ways it be, the patient is [illegible] that he is, in that accession.

When it is observed, that rigor and horror take place, the patient is not in danger from the paroxysm: it is not meant that he is free from danger from the paroxysm, because there are many dangers which may arise during a paroxysm, besides that of the accession: [illegible] of [illegible] considerable degree, as horror and rigor have [illegible] a simple fever.

Frequency of pulse is not a necessary part of fever, since the disease called fever (or an attack of fever) may prove fatal to the patient without any frequency of the pulse above its ordinary rate. It follows, that this frequency of the pulse is not to be considered as an appearance of the attack of the disease *necessary to constitute the paroxysm*; and is therefore to be enumerated among the appearances of the *second stage*.—Not but that it happens often, when a patient is carried off by the first stage of fever, that his pulse becomes much more frequent than its ordinary rate; (sometimes 140, 150, or 160 strokes in a minute, or as frequent as can be counted). This however does not prevent the author from deeming frequency of the pulse an accident only in the first stage; depending on the flow of blood upon the heart.---It seems to be a more decided appearance of the second stage ; for a second stage of a *simple* fever, or an *intermittent*, it is believed, has never been seen without it. Yet in *continued* fevers, the author has frequently seen all the other symptoms of the second stage, without any frequency of the pulsation of the arteries above the common rate, (which is 73 strokes in a minute) : indeed he has often seen it much below 73, when all the other symptoms of the second stage were present in an high degree. ---He believes, however, that this is only that the *heart* is not affected with the disease ; or rather, that a greater degree of *insensibility has taken place in it*, than in the other parts of the system.---Therefore, frequency of the pulse should *properly* be enumerated among the appearances of the *hot* fit of fever.

The pulsations *increase* as the hot fit comes on, to 100 or more strokes in a minute ; and continue frequent during the whole of the hot fit :---and are often much *fuller* and *stronger* than in the first stage of the disease.

Along with this frequency of the pulse, a greater degree of *Heat* takes place : but it is independent of it, bearing no proportion to the frequency of the pulse.---Sometimes when the pulse is very frequent, the heat to the feel of the patient, to the thermometer, and to the practitioner ; is less than the temperature in health.---Sometimes the heat is greater ; when the pulse is by no means very frequent, full, or strong.

The *Heat* of the human body, if taken by a small Fahrenheit's thermometer under the tongue, with the mouth shut ; is 97° and a half, in a person in perfect health.---It is the same, (if an opportunity should offer of examining it,) in any of the interior parts of the body ; seldom altering a degree, as long as a man remains in health ; of whatever temperature the external atmosphere or surrounding bodies may be.---How such an exact temperature should be maintained, it is not the object at present to discuss.

The greatest degree of heat the author ever observed in fever (and he has paid attention to this point) is 105° : he has seen in many authors much greater degrees mentioned, (110° and 112°) : but never found in any fever, (either simple, continued, or intermittent,) an higher degree than 105.---It *varies* very much in the hot fit of the paroxysm of a *simple* and *intermitting* fever. During the hot fit, it degrees above the healthy temperature; although sometimes it is not more than 100° or 102°.---In the hot fit of the paroxysms of *continued fevers*, it falls sometimes below the healthy standard.

The heat by the thermometer in *different parts of the body* is very uncertain in fever.---It can be best observed under the Tongue. In the extremities it can never be taken perfectly, unless there should be a wound or ulcer into which the thermometer can be introduced: in this case, the heat is nearly the same as under the tongue.---But in the hot fit, especially at the beginning, it varies considerably in different parts of the body. In some parts, it is four or five degrees below the healthy standard: while in other parts, it is as many above it: (although the whole body be equally defended from external exposure to heat or cold, and although the circulation appears to be the same in the hotter and colder parts of the body.)---This happens only in the beginning of the hot fit. After it has completely taken place, whether the fever be continued, remittent, intermittent, or simple, the heat comes to be equal over the whole body; although it cannot be perfectly measured in the extremities, unless there should be a wound into which the thermometer can be introduced.

2. Although *Frequency of the Pulse and Increased Heat* are often found in the first stage of the fever: yet it has been shown, that neither of them is essential to this stage, not even when it proves fatal.---But both frequency in the pulse and greater heat, are always found in the (Hot Fit or *Second Stage*) of a simple fever.---It is therefore obvious that they constitute a principal part of this *second* stage, which is evidently a means of cure, arising out of the disease itself, in carrying off the first stage; (which is the whole alteration from the healthy state of the body.)---This is especially proved by the pulse not only becoming more frequent: but likewise for the most part fuller and stronger, in this second stage (or hot fit.)---This indicates a greater difference between the size of the ventricle of the heart when dilated and contracted; therefore a more extensive contraction of it: and likewise that it exerts itself with greater energy, (or in other words contracts with greater force,) so as to throw a larger quantity of blood into the aorta at each contraction, and to throw it in with greater force; and thus to increase the *Circulation* throughout the whole system.---For certainly, if there be a greater difference between the contracted and relaxed state of the ventricle; so that more blood is thrown into the aorta at each contraction, and

the contractions are more numerous ;) a larger quantity of blood must circulate through the whole body.—It is true indeed, that when it passes from the aorta, it may not circulate through *every* branch of it and every capillary vessel, with greater velocity ; but it must pass through *some* of its branches and some of the capillaries, with greater velocity. If some of the capillaries, and some of the branches of the aorta are contracted ; then it must still pass through the others with an additional velocity ; and in consequence, meet with a greater resistance ; which will force it to attempt to pass through those vessels which are contracted, with greater force.—Since then a number of the vessels are evidently contracted in the first stage of the disease ; this would render the solution of the effects of the hot fit (or second stage) in carrying off fever, easy ; for it would resolve itself into this ;—that the small vessels being contracted throughout the system, propel a large quantity of blood upon the heart ; which stimulates the heart to make stronger exertions ; so to throw the blood with greater force into these contracted small vessels, force them open, and thus carry off the disease.—And such has been the solution given by those, who have *precluded any alteration in the fluids from being the cause of the disease.*

Whether the *Fluids are altered* by the *hot* fit of a simple fever, is a point to be determined only by experiment.—But no alteration in them has ever been shown in *any* fever ; much less in a *simple* one, (which continues only eight, ten, or twelve hours).—On the other hand, it does not require any precise time to produce an alteration in the chemical properties of the fluids : it may take place instantaneously ; much more may it happen in two or three hours.—But the possibility of such alteration of the properties of the fluids by no means proves that it *has* actually taken place ; any more than the possibility of its not happening, proves that it *has not* taken place.

Upon examining blood carefully taken in the first stage of fever, and blood taken in the second, or even in the crisis ; the author in many instances has found no sensible difference among them.—In the spontaneous separation of the blood, (in which the coagulable lymph separates from its water and the serum, and entangles the red particles at the same time, so as to form a coagulum ;) the *coagulable lymph* itself has been found exactly the same in all the stages of paroxysm of a simple fever.—The *red particles* are the same in all their sensible qualities, as far as they could be examined by any chemical process; the *coagulum* of the coagulable lymph is the same; the *serum* the same; the *superfluous water*, *putrescent mucilage*, and *salts*, contained in the blood, are likewise the same; (as appears from experiments which the author has frequently made and repeated: It is useless to detail these experiments, as they are only negative proof, that in *many* cases the fluids are not altered by the hot fit of a simple fever.)—In *other* cases alterations have taken place; but not in simple fevers, (as will be mentioned afterwards): yet, more frequently, there is no sensible alteration whatever.

It has indeed been said that the fluids were *attenuated;* and a thousand things besides. These are the dreams of speculatists; not confirmed by one experiment; and as such are to be entirely rejected.

Until then it is otherwise proved, (which there is no reason to imagine it will be, after the attention which has already been paid to the properties of the fluids in fever, without discovering any alteration in them;) the author may be allowed to conclude, that the hot fit makes no alteration in the fluids.

It is next to be considered whether the *Greater Action of the Heart*, (propelling the blood with additional force into the small vessels,) really removes the contraction; and so carries off the disease.

There are at least *two* distinct parts in the attack of fever; *contraction* of the small vessels, and *depression* of the powers of the body. These two are not in proportion to one another; but sometimes, when there is a great degree of contraction, there is very little depression of the powers of the body; and depression of strength is not necessarily attended with greater contraction of the small vessels.—There is also *Affection of the Stomach*, (apparently independent of the other external appearances;) which may perhaps be considered as a *third* distinct part:—But the contraction, depression, and affection of the stomach together, are possibly no more than the exterior indications of some *other* alteration, of which no probable conjecture has hitherto been formed.—If *contraction* of the vessels is *one of these appearances only*; some hesitation must arise in the mind to allow, that removing it, (or as it has been called by some, taking off the spasm,) would cure the disease.

It is first to be considered whether the disease is carried off in proportion to this strong action of the Heart.—But here a distinction must be made; without which great error may be fallen into. *Ful-*

ness and strength of the pulse, which frequently take place in the hot fit of fevers, as well as in other diseases, have often been called *hardness;* (as has already been observed of obstruction.)---Hardness of the pulse is undoubtedly a feel of action in the *arteries,* and not in the heart. It may exist with a small pulse, when the ventricle throws out a small quantity of blood at each contraction; with a weak pulse, as in hectic cases near their end; with a slow pulse, as in chronic rheumatism: and therefore does not at all depend upon the action of the *heart.*---It also has this concomitant symptom; that it produces *in the blood a disposition to remain fluid* after extravasation: so that the red particles shall fall from the surface before any coagulation takes place, and the upper part shall afterwards consist of coagulated coagulable lymph, (forming what is commonly called a buff upon the blood). This takes place not unfrequently in a paroxysm of a *simple* fever; but it is not necessary, or even common. (When it does, it always gives a great disposition to prolong the paroxysm; and convert it into a compound fever.)—The consideration of this appearance then must at present be entirely laid aside.

It is so obvious to suppose, that the strong action of the heart propelling a great quantity of blood, (with force,) into the small vessels, is that part of the hot fit, which carries off the disease: that this opinion has on first view been universally adopted.---And in all the rude ages of medicine, *Stimulants* have been constantly employed to increase the action of the heart; in order to shorten the paroxysms, produce crisis, and change compound into simple fevers. But when the art has been more refined, (as by Sydenham in our country,) these stimulants have been rejected; as tending to prolong what would otherwise be a simple fever; and converting it into a compound one.---It may be affirmed therefore, that although in rude ages the idea has been formed, that the greater exertion of the heart is the means by which the unassisted operations of the body carries off the disease; yet when practitioners in medicine become more conversant in it, this opinion was by them thrown aside.---Many practitioners however, who have not considered the subject maturely, still retain this notion; which is certainly erroneous.---It mu[illegible]e owned, however, that although the increased action of the heart produced by spices, wine, and other stimulants very often prolongs the paroxysm, and converts a simple into a compound fever; nevertheless sometimes it has happened, that on exhibiting these stimulants, a *paroxysm* has been sooner and more perfectly carried off: but this has happened so rarely, (not once in fifty times,) and on the other hand the paroxysm has been so frequently prolonged by them; that they do not seem of such utility, as to authorise our employing them in practice.

However, the increased action of the heart is certainly for the most part greater in *simple* than in compound fevers; and, in *intermittents*, whose paroxysms are shorter (and the increase of action of the heart by means of stimulants now and then makes them still shorter) it may be greater likewise than in a continued fever.---So that it can be hardly doubted, that the increased action of the heart is *one means of the cure of the first stage;* although far from the only one.

Other means are therefore to be sought; and the next which offers is some *Action of the Stomach.*

It frequently happens that *Sickness* takes place in a simple fever; not in the first attack, but in the beginning of the hot fit.---Some have imagined that this has such an effect, as to co-operate with the strong action of the heart; so as to carry off the disease.---They have been led to this more particularly by observing, that certain remedies which sometimes produce sickness, do frequently bring on a crisis sooner or more perfectly; (such medicines, for instance, as tartarized antimony and ipecacuanha.)---But there are many simple fevers in which no sickness ever takes place; and yet they terminate as perfectly, and the crisis is as complete, as in other cases where sickness does take place.---Sickness therefore cannot be considered as a cause existing in the hot fit which carries off the disease. —Medicines, (such as tartarized antimony and ipecacuanha,) which certainly have a tendency to bring on a crisis and render that crisis more perfect; frequently, while they do so, produce no sickness. When a large dose of these medicines can be borne upon the stomach, *without* occasioning nausea; they are more efficacious in rendering the paroxysm shorter, and converting the fever into a simple one; than when the stomach will bear but a small quantity without producing nausea.---In this case, indeed, they rarely have any effect in carrying off the disease.---It is farther to be observed, that there are several *other* medicines which produce sickness in as violent a degree, (such as squills); which, in whatever dose they are exhibited, have no effect in bringing on crisis in fever.—Upon the whole therefore it seems evident, that sickness does not tend to carry off the disease; but that the sickness is only a *concomitant* effect of a certain *Action of the Stomach;* (arising from the action of medicines which produce a crisis; or arising from the action of the powers of the body through the fever itself.)

Since a patient is not carried off by the *first* stage of a simple fever after horror and rigor have taken place, (which seem to arise evidently from affection of the stomach,) and since loss of appetite likewise, and sometimes nausea, appear at the beginning of the *Hot Fit;* a suspicion may be entertained, that *some Affection of the stomach* produced in the first stage, *at least concurs* in carrying off the contraction of the small vessels and the inaction of the powers of the body throughout the system, (or the cause on which these external appearances depend).—For the stomach has very great influence on the other parts of the system; as appears from the effect of many medicines which have their operation entirely on the stomach before they can reach any other part. *Spices,* (such as nutmeg, cinnamon, &c.) produce a glow of heat over the whole system, the moment they are received into the stomach: but when they have been thrown into it six or eight hours, their effects are entirely gone off; and instead of the body being stimulated, languor succeeds. (It is well known, that the effects of spices depend entirely on the *essential* oil they contain: this is far from being volatile; and has no chance, therefore, of evacuation out of the body, by evaporation, in that time; and it often happens that no other evacuation takes place, by which it may be discharged: They cannot therefore have their operation in the blood-vessels, or any of the secretory organs.) —It has been supposed, that the nerves of the stomach took up this essential oil, carried it to the brain, and thence to the other parts of the body; but without the smallest proof of any kind whatever.— It appears, therefore, that the whole of their operation is on the stomach.—*Opium* likewise, by its operation on the stomach, affects the whole system; for it is not swallowed five minutes in many cases, before the effects of it begin to be felt; and they are entirely gone off in eight or ten hours; (although there be no reason to believe that any part of it has gone out of the system). Perhaps, being diluted with the whole mass of fluids, it no longer produces any effect; while, if applied in a more concentrated state to the other parts of the body, it would certainly have considerable action.—*Peruvian bark*, exhibited in substance to the quantity of half an ounce or an ounce, just before the attack of the paroxysm of an intermittent fever, (the time of which is known;) will in many instances prevent that paroxysm from taking place. The effect therefore must be on the stomach: for there is not time for it in this space to be dissolved and carried into the blood vessels; it cannot get into the blood-vessels in the form of a powder; and if it be exhibited already dissolved in water or any other menstruum, it is not nearly so efficacious as when employed in powder: consequently the whole of its effect in this case must be on the stomach.

It is sufficient to have enumerated the effects of these medicines, to show that the stomach has great influence over the other parts of the system.—It is, however, *by no means to be supposed that the action of all medicines is entirely, or principally on the stomach.* Mercury, for instance, may be exhibited so as to affect the stomach and produce sickness; but in consequence of this affection of the stomach, none of its other powers are exerted. In order that they should be, it is necessary that it should be absorbed and carried into the course of circulation: for it will equally produce its other effects, if it be absorbed from the skin or any other part of the body. —All that is intended to be shown is, that this affection of the stomach has *very great power over the rest of the system*; and very probably *co-operates* with the increased action of the heart, in carrying off the contraction of the small vessels and the inaction of the powers of the body, (or the more unknown alteration from the healthy state of the system on which these depend).

This increased action of the heart and affection of the stomach, may be the only efficient powers exerted in the *hot* fit of fevers;—or there may be *others* with which we are totally unacquainted.

In investigating the effects brought on by the *hot* fit, we must select those appearances which take place in a fever, consisting of one paroxysm only; (and which is terminated in eight, ten, or twelve hours:)—for there are many which happen in compound, that do not appear in simple, fevers.

The first that shall be taken notice of are *Fulness and Strength* of the pulse, added to its *frequency*; (which in many instances is very much increased above that which arises in, and is a part of, the first stage of the disease.)---The *Pulse* is often much more frequent in a *simple* fever than in the *paroxysms of intermittents;* and still more so in paroxysms of intermittents, than in *continued fevers.* (In simple fevers, it is not uncommonly 140 or 150 strokes in a minute: full, strong, and very much obstructed.)---In the paroxysms of intermittents and continued fevers; it is not unfrequently *hard* at the same time: But this seldom happens in the hot fit of a simple fever.---Some authors have mistaken obstruction of the pulse, for hardness.---Sometimes, the disease terminates in *Topical Inflammation,* without any crisis happening, (as is hereafter to be described); in which case, although the pulse be hard, the fever cannot be considered as simple.

The *Circulation* is, therefore, universally increased; although unequally.---In some of the small vessels in every part of the body, it is increased; so as to produce redness and fulness of all the parts, and an increased size of the veins.---But then many of the small vessels in every part remain contracted: (as may be gathered from the exterior parts, although they have a degree of redness, still retaining their dirty reddish brown color; from the contracted state of the secretory organs, and thence the diminution of the secretions, which still continues; and from the dryness of the skin and tongue.) —It appears from these sufficiently evident, that although some of the small vessels are so far enlarged, as to let more blood pass through them; yet others remain still contracted.---The circulation, therefore, is increased by the strong and more frequent action of the heart, and greater difference between the contracted and relaxed state of the ventricle, propelling the blood forward through some of the vessels; while others remain contracted.

At the beginning of the hot fit, and before it is perfectly formed, the circulation is variously affected in different parts of the body; (that is, the circulation is evidently greater in one particular part, than in others.)---It frequently happens that one part shall become red and swelled, while others remain pale and contracted; (one arm for instance, shall be red and larger, while the other is pale and contracted.) The veins of the one shall be full, and the blood flow in them more rapidly; while those in the other remain contracted. This shall continue for a certain length of time; when that part, which was red and swelled, with the veins distended, shall become contracted, pale, and the veins contracted: while that which was pale and had its veins contracted before, shall become full, red, and have its veins distended.---This shifting, however, remains but a short time in simple fever; perhaps not above half an hour. In paroxysms of intermittents, it continues longer; and still longer in the first attack of continued fevers.—*Universal redness* at length takes place in all cases of simple fever; together with fulness, and increased size of, and greater circulation through, the veins; *accompanied* however with appearances of contraction.

The *Heat* is frequently much greater in the cold fit (or first stage); than in the ordinary state of the body. Even when the patient feels himself very cold, the heat (as ascertained by the thermometer) often arises to as great a degree as it ever does in fever.---When the *second* stage comes on, the patient begins to feel himself hotter, but unequally: sometimes one extremity is felt cold by the patient, the other extremity hot; sometimes the extremities feel cold, when the patient feels the parts about the thorax very hot. But this inequality is less and subsists for a shorter duration, in a simple fever; than in any other case of the disease.---The heat is more unequal in the paroxysm of intermittents: and frequently much more, in the first attack of continued fevers.---The heat over the whole body in a simple fever seems intense to the patient; yet upon application of the *thermometer*, it is often found even less, than it was when the patient felt himself cold. When the patient has felt himself universally cold, it has frequently been found 105° under the tongue; but when he felt himself extremely hot, it has been reduced to 102° or 103°.---It would be difficult in these cases to believe the thermometer a perfect measure of heat, did we not know that our *sensation of heat is extremely fallacious*; while we have no reason to doubt that the different expansions of mercury and glass are uniform, in showing the variation of temperature, (since they are always the same in every fixed point of heat: as in the boiling of fluids under the same degree of pressure, and in a solid becoming fluid, &c.) Notwithstanding, therefore, that the patient feels himself excessively hot in the hot fit of a simple fever; yet he is really not more so, than he was in the cold fit; (frequently not even so hot.)

There is considerable *Thirst* in the beginning of the first stage of a simple fever; which is greatly augmented in the *second* stage.—It is difficult to account for this augmentation. The tongue is not now drier, nor the mouth: there is as yet no evacuation, by which the proportion of water can be diminished in the blood-vessels.—Perhaps the exertion of the powers of the heart, (which the author has considered as one of the operations tending to carry off the disease,) may create thirst. Perhaps it may be the superior sensation of heat, (although not accompanied by actual heat,) that may occasion this superior sensation of thirst. Perhaps it may be the affection of the stomach :—But these points cannot be determined.

The patient is sometimes so much depressed in the first attack of simple fever, as not to feel any *Restlessness :* but at other times a considerable degree of it takes place : and it never fails to come on most violently in the second stage.---If it did take place in the first attack, it is very much increased during the second stage.—The patient feels the time gone through infinitely long ; a minute seems to him more than an hour : he cannot fix his attention on any object : he does not lie easy, and finds no relief in changing his posture.—It is difficult likewise to say, from what cause this takes place.—It is certainly different from the *anxiety and oppression* which arise about the praecordia in the first stage of the disease.

There are two apparent *causes* of restlessness and anxiety in the system.—*One*, is an accumulation of blood in the lungs, and in the auricles of the heart and in the veins leading to them.—The *ventricles* of the heart can never be said to be oppressed with blood ; since there is a period in each of their contractions, in which the valve, which is situated between the ventricle and auricle, is shut. No blood therefore can be thrown into the ventricles during the time of their contraction ; (when they are clearing themselves by propelling the blood into the aorta, or pulmonary artery.)—In the *auricles*, there is no such provision ; but the blood is pressing into them, even during the time of their contraction ; and gives resistance to it. The veins near the heart, if the blood be thrown upon them by the contraction of the veins in the other parts of the body, and the auricles ; are not capable of conveying it away ; but must be distended.---This produces evidently, anxiety and restlessness.---*Or* restlessness may arise in the first stage, from universal contraction of the *small vessels ;* and may continue in the second stage, from the contraction remaining.---In the second stage, the increase of circulation, (from the stronger action of the heart through such vessels as become of larger diameter,) may add to the distension of the larger veins near the heart. The ventricles nevertheless, being more dilated in the time of their dilation, though more contracted in the time of their contraction, as appears from the pulsation of the arteries being much greater and fuller;) may take off the additional quantity of blood;---so that, perhaps, the whole anxiety remaining from this cause may not be greater in the hot fit, than it was in the first stage.

Another cause of restlessness and uneasiness, may arise from distension of the small vessels throughout the system. This produces uneasiness over the whole body; accompanied with anxiety, restlessness, and the same idea of the prolongation of time.---The author however, would not be confident that this was entirely the cause of restlessness in the hot fit of simple fevers; especially at its commencement.---There are various causes which may produce it: as many affections of the *mind*, independent of the diseased state of the body, (which is therefore foreign to the present subject;---not but that the mind is affected in fever as well as the body; but this has been considered as part of the first stage.)

There are *many diseases in which*, (independent of accumulation of blood in the large veins near the heart, and tension or the small vessels throughout the system,) restlessness, uneasiness, and the idea of prolongation of time, may be produced.---If for instance substances get into the *stomach*, which disturb it, without producing sickness or nausea: the same sensations frequently take place.—When substances get into the stomach which are disagreeable to it, the first operation that happens is, that the small vessels throughout the system are contracted; as appears from the universal paleness which takes place. The blood is thrown in large quantity upon the lungs, and veins near the heart, and its auricles: occasioning a sense of weight and anxiety: (this may be said to be owing to the fulness of the veins near the heart, and of its auricles). After this paleness, there arise some or all of the following symptoms; universal heat, strength and frequency of the pulse, swelling in every part of the body, cutaneous eruption, inflammation of the head, great tension of the system, and uneasiness, which may be ascribed to the tension.—But there are many substances, (such as food of high flavor, or producing a viscid solution,) which (without causing a paleness, nausea, tension, &c.) will, if eaten in too great quantity, or if thrown into a stomach not sufficiently powerful for their digestion; occasion the same sense of uneasiness, restlessness, and the same idea of the prolongation of time.---There may therefore be affection of the stomach, independent of sickness or nausea and independent of any tension; which may occasion restlessness, uneasiness and idea of prolongation of time.

Delirium may take place in the *first* stage of fever; in consequence of either the depression of strength in the body or the mind, or contraction of the vessels of the brain.---Delirium may also take place in consequence of the *second* stage of the disease; and that in a simple fever: this delirium happening much more frequently in a simple fever, than it does in the paroxysms of intermittents.---The delirium that takes place in the second stage, would appear to depend entirely on the increased action of the heart. The pulse becoming very full, strong and frequent, there arises *pain* in the head; ---dissimilar from the pain which took place in the first stage. (That which took place in the first stage is clearly a pain affecting the *integuments* of the head; perhaps the skin alone, at most the pericranium: but the pain which arises in the second stage is felt by the patient *internally;* and gives him the idea that there is something distending the head or the brain, so as to attempt to burst the cranium. It is not more, nor often so violent, as the pain taking place from the first stage of the disease.) The delirium it produces, while it remains, is considerable;---that is, the patient often mistakes one object for another, although the organs of sensation still make an impression on his mind. He can see, for example; but he mistakes one man for another or for a post. His organs of hearing are often more readily affected; but not with the ideas that would be produced by the same sounds were he in health. The same thing happens with regard to his other senses.---In the mean time, the carotid and temporal arteries beat full and strong; the eyes are rather red; and the face flushed. There is therefore reason to believe, that this delirium arises from compression of the brain, by the quantity of blood thrown up into it by the increased action of the heart.

This delirium, if unaccompanied with hardness of the pulse, by no means retards the crisis.—But if hardness of the pulse, (independent of obstruction,) should take place; it often converts the disease into a compound fever.

With these symptoms, (as far as they are compatible with them,) *all those appearances* which take place in the first stage of fever, *continue.*---Some, however, are incompatible: the pulse cannot be full and strong, for instance, and at the same time small. Otherwise the pain in the forehead, depression of strength, foulness of the tongue, and contraction of the secretory organs, &c. all continue.

Fevers generally differ from one another in the *Duration* of the hot fit.—Although a fever which has been called an ephemera, (as lasting a day and a night) has been described by Greek physicians, as attended with as violent symptoms as any fever;---yet by modern practitioners a disease under this name has generally been attributed to excess; (such as drinking too large quantities of wine; or the application of some other such stimulus, which occasions a frequency of pulse and heat, for a certain length of time).---This affection does not in any way resemble a fever, there being none of the other symptoms of that disease.

A simple fever, such as the author is describing, does not often last a day and a night; but is often terminated in eight, ten, or twelve hours.---The disease going off, does not return again: and then may be considered as perfectly simple. Or it does return again, and forms a compound fever; (the history of which will be shown in future dissertations.)

Nevertheless, the hot fit in simple fever may remain for a much longer time; may continue two days, or even run into the third, without any fresh exacerbation; and may be carried off.---This happens from the prolongation of the second stage; but this is extremely rare.

Much more frequently in simple fevers, the first stage does not continue above two hours.---The second stage rarely continues afterwards for more than two or three hours, before the crisis begins to take place.---It frequently happens that it continues a much less time: when the disease is not terminated by a crisis; but by an inflammation or an hæmorrhage.

The first manner in which a simple fever *terminates*, has been called a *Crisis*.---Italy and Rome having acquired their science from Greece, were exceedingly apt to adopt Greek phrases; more particularly in medicine, because almost all the physicians among the Romans were Greeks.---But the terms were employed very vaguely. Crisis, for example, was used for any termination of any disease; good or bad. Among the moderns, there is nothing so prejudicial to medicine as the introduction of Greek names; especially as they have been adopted by numbers who do not understand one word of the language.—When the term crisis is made use of in the present work, it always means the going off of the *first* stage of fever, in the manner here described.

The hot fit having continued a certain time, is the occasion apparently of the crisis:* either by means of the increased action of the heart and arteries; the affection of the stomach; or both taken together: or perhaps by some other operation which has not as yet been discovered.—Sometimes one of the symptoms of the first stage gives way first; sometimes another: so that it cannot be said which has the priority.—When the symptoms of the first stage are carried off, those of the second stage go off of course; (being produced by those of the first: So that if the first stage had never taken place, the second would never have come on.)---Nor does the second stage continue (like the first) independent of its cause; but leaves the patient as soon as its cause is removed.---It is the symptoms of the *first* stage that *first* apparently give way: sometimes the great sense of weight about the præcordia; sometimes the obstruction of the pulse: Sometimes *Relaxation of the Secretory Vessels* takes place, &c.

But the most striking appearance to the patient and by-stander, is the relaxation of the vessels of the skin: in consequence of which, *Profuse Sweating* arises;---which has been supposed by many eminent practitioners, to be *an evacuation of something noxious* to the system which was the cause of the disease.

It is difficult to procure a quantity of the fluid, so secreted, sufficient to determine its qualities. Some may be procured by taking it off from the skin by a spoon, or by washing the linen in distilled water.---By the first method it is difficult to procure more than two or three ounces: in most cases hardly one. It is a fluid not perfectly transparent: and its want of transparency depends on an *oily* matter; which on standing in a close phial, rises to the surface; and consists partly of expressed oil, and partly of the oil which gives the peculiar smell to the body. In both these respects it agrees with the oily matter commonly secreted in the sweat of a man in health.---After this oil has risen to the top, so that the *watery* part becomes transparent; on evaporating it, a *mucilaginous* matter is found. If the heat employed for the evaporation be under 150°, it is nearly colorless, and perfectly soluble in water again: But with a greater degree of heat, it acquires a brownish color.---Along with this mucilaginous matter, *saline substances* are found; but in such small quantity, when the sweat is taken from the skin by a spoon, that it can hardly be determined what they are.---When taken from the linen of a patient washed in distilled water, filtered and evaporated; *natron muriatum*, *ammonia muriata*, and *ammonia phosphorata*, are found.---All these substances are found also in sweat excited in a healthy body; (so that as far as can be judged from experiment, there is nothing in the matter evacuated by sweating, which is not found in health.)---It is possible, indeed, that something may escape chemical experiment; but it must never be presumed that there is. Too often a possibility of substances or circumstances existing that the nicest scrutiny could not detect, has been deemed a sufficient proof that such circumstances or substances did actually exist: but a proof, and not a possibility, is always necessary to induce the smallest belief of their presence.---There is therefore, the highest probability that there is nothing in this evacuation different from the sweating that takes place in a person in health; and that it arises merely from *relaxation* of the vessels of the skin.

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* It is proper to notice, that what the author calls a crisis in simple fever, if it occur at all, occurs in the *course* of the second stage of its paroxysm.

Although profuse sweating most commonly takes place in the going off of a simple paroxysm of fever, by crisis; there is sometimes only a *gentle moisture on the skin;* which is at the same time relaxed.

The *skin* returns likewise to its healthy color: but this happens only towards the end of the crisis: or we should rather say, that the true skin receives its healthy florid color from the blood circulating through the small vessels; and overcomes the color of the coloring membrane of the skin and the color of the sebaceous matter.---Indeed there appears to be more color in the first stage of fever, from the sebaceous matter of the glands, and the coloring membrane of the skin; than in the healthy state; and that this is part of the disease. But this color will be more concentrated in consequence of the contraction of the skin; (since the sebaceous glands will be brought nearer to one another, and likewise the different parts of the coloring membrane of the skin; so as to give, as it were, a deeper tint.)---When the contraction of the skin goes off, this color goes off likewise. But this never happens at first, (whether there be much or little evacuation by sweating); but towards the end of the crisis, or when it has completely taken place.

The evacuation by sweating takes place, in the greatest number of simple fevers, for several hours very profusely.—But *as in some it is but trifling;* it would not seem a necessary means of carrying off fever. Probably it is merely *accidental,* and a consequence of the relaxation of the skin and continued strong action of the heart. —It is to be remarked, however, that *no simple fever is completely carried off by crisis,* without *some* degree of moisture of the skin.

The *Urine* is also secreted commonly in larger quantity in the crisis of fever.---But what is more remarkable in it is, that if it be collected in sufficient quantity, and let stand for some time, it becomes turbid; and *flaky Crystals are deposited of a dirty red color.*---This deposition almost always takes place on the going off of a simple fever by crisis; and that, even when the febrile appearances have been very slight; often, when it was only an increase of the ordinary evening paroxysm of fever.---This matter seems constantly to be contained in the urine, even in health, but with different appearances.---The urine, when first evacuated, is perfectly transparent; and (what is commonly called in liquors,) bright: remaining so, while it stands in the heat of the human body.---We are unacquainted with the state of it in this respect in those climates where the heat of the atmosphere is equal to that of the body.---If this matter has separated from it by standing, it re-dissolves on being heated; provided no evaporation has taken place.

These dirty, red colored, flaky *Crystals* appear constantly (as far as the author knows) in that crisis of a simple fever, which *entirely* carries off the disease.---If they were wanting, he would hardly hesitate to say, that it was not a paroxysm of simple fever; but that the fever would be repeated, although all the other symptoms denoted a perfect crisis.---The appearance of these flaky crystallizations seldom takes place towards the beginning of the crisis; but generally *after the sweating has continued some time.*---The matter of these crystals has been considered by many authors, as the *matter that occasioned the disease;* changed and made fit for evacuation:---But that it is not, will appear from many considerations. In the first place, it is always present in health; (only not in such quantity, as to crystallize in flaky crystals;) and it is so, at all times in the twenty four hours. The quantity, indeed, in health is so small as to be hardly weighable: Even when it is copious, if separated from the other parts of the fluid by filtration and dried, it hardly ever weighs so much as five grains, if we take it from all the urine secreted in twenty four hours.---From the quantity, it hardly can be supposed that it can ever produce any great variation in the system; much less in such a disease as fever.---It not only makes its appearance in the crisis of fever but likewise in many *other diseases*, both of the system generally and of particular parts; and often, in diseases where no frequency of the pulse, nor any derangement whatever of the system generally, nor any particular affection of the organs of secretion, takes place.---The appearance of this substance, therefore, must be considered as not at all essential, but only accidental: (perhaps from relaxation of the organs of secretion;)---although its appearance is of great importance in *determining the crisis*, not only of simple, but of compound fevers.

The *Mouth and Tongue* (which were dry in the attack) *become moist* during the crisis; and the tongue becomes clean.---The tongue has been described as covered with a particular kind of *Crust*, which adhered to it as part of itself. In the crisis, this crust falls off in a surprising manner.---It is known that when any part of the body *dies*, or is killed by any means; a process immediately takes place, by which that part of the fibres where the living and dead were mechanically united, is *converted into a fluid:* in consequence, the dead and living parts are separated from one another; and the dead parts of course, if they were on any external surface of the body or on the surface of any cavity that opens externally, are thrown off.---It is true, indeed, that Mr. Hunter and some other pathologists have held an opinion, that the *absorbents* took up this part of the fibres; but it is impossible that an absorbent should take up part of a fibre, unless its continuity had been previously broken by some mechanical or chemical means. There is no mechanical power in the orifice of an absorbent vessel that can break the continuity of a fibre: it must be broken by the conversion of it, by some chemical means, into a fluid.---It is by a *similar operation, that the crust* which was formed on the tongue in a simple fever is thrown off; for the crust adheres to the surface as part of itself.---This separation is much more conspicuous in the crisis of a simple fever, than in any other case; for the whole takes place in an hour or two, so as to leave the tongue completely clean. The *edges* of the tongue first become moist, (but that is where the crust did not occur;) and their moisture is in common with that of the rest of the mouth. The crust itself comes off in small flakes every where over the surface; at first leaving (as it were) specks where the tongue becomes clean, and others where the crust still remains; until at last, the whole surface of the tongue is entirely in its ordinary state.

When a dead part is exfoliated from a living part, it leaves the surface of the living part in many cases, in a state of exulceration. ---In some cases, however, it is left in a healthy state; as (for instance) when these sloughs which are formed in the erysipelatous sore throat, are exfoliated, an indentation remains in the surface of the membrane: but in this hollow, the membrane is perfectly sound; the hollow gradually rises up, and is obliterated.---The surface of the tongue is perfectly sound when the crust is exfoliated in a simple fever:---it is by no means always so in compound fevers. (In the crisis of a simple fever, the crust is entirely carried off from the tongue; and it is left perfectly clean and in its healthy state).

At the same time the *Mouth becomes moist.*---It was dry, from the contraction of the secretory vessels of these glands, whose excretory ducts open into the mouth.---There are four large glands, (the two parotid, and the two submaxillary,) which secrete the saliva at a distance from the mouth, and whose excretory ducts run a considerable way before they terminate in it. In the crisis of a simple fever these glands secrete a larger quantity of saliva; but not so much as to be thrown out from the mouth.---It is proper to observe, that the fluid which these glands secrete is *destined to be employed in the stomach.* If a larger quantity be secreted than is useful in the stomach, it is evacuated by the mouth.---The principal purpose for which the saliva is made use of in the stomach is for the *digestion of the food.* During the first and second stages of a simple fever, no food is thrown into the stomach; or if it be, it is not digested there: consequently although little or no saliva be secreted, there being no want of it, no mischief ensues.---When the *crisis* has taken place, the *appetite* is immediately restored; and a greater quantity of the saliva passes into the stomach unperceived.---A more copious secretion of it has not therefore been observed in the crisis of fever; especially in simple fever.

There are various *other glands* situated in the mouth which secrete *mucus;* and *perhaps saliva, or some other fluid or fluids.*---These serve to keep the mouth moist; which it becomes by degrees in a very complete manner, in the crisis of a simple fever; especially at the end.---But from none of the glands of the mouth is there any such remarkable or copious secretion, as from the *skin or kidneys;* nor is there any thing in those fluids secreted, different (in as far as any experiment hitherto made has shewn) from what is found in health.

The *Thirst* which takes place in fever arises partly from the dryness of the mouth. The thirst, so far as it depends on this cause, must (in consequence of greater secretion from these glands) be removed.---But it also depends on the state of the stomach.---And it also has been said to depend partly on the want of fluids in the blood-vessels. The large evacuation by sweating which takes place in the crisis of a simple fever, carrying off large quantities of watery fluids, occasions a want of them in the blood-vessels: and therefore it might be expected to have the same effect, as when sweating is produced by a warm atmosphere, or exercise, or any such cause. But this is so far from being the case; that the stomach being relieved from the fever and the tongue being moist from a greater secretion of fluids into it; the thirst which took place in the first and second stages of the disease, is carried off; so that although the sweating be profuse, the patient is relieved from this symptom towards the end of the crisis of a simple fever.

In the first attack of fever, (supposing it to be complete,) less *Bile* is secreted, and less *Pancreatic Juice;* and there is also *less Secretion* from the mucous glands and other glands of the intestines, *through the whole intestinal canal.*---When the fever is present, there is therefore less matter to be carried forward by the peristaltic motion.---If food were in the stomach when the fever came on, or even if it had got in four or five hours before; (no change being made in that food by the ordinary processes of digestion, during the paroxysm of simple fever;) that part of it which is indigestible, does not get into the intestines; and therefore *cannot be carried forward by the peristaltic motion.*---The author likewise suspects, that th *canal itself is contracted in the fever;* and that the food is hardly digested till after the fever has ceased, if it has continued only ten twelve hours.---From the food beginning to digest (towards the end of the crisis); but more from the pancreatic juice, mucus, and other fluids secreted into the intestinal canal, being formed and thrown into it in greater quantity, (from the contraction of the canal going off and the peristaltic motion returning to its ordinary state); the *evacuation* from the intestines comes to its usual quantity:---but it is not much increased in common, in the crisis of a *simple* fever; although in the crisis of *compound* fevers, it is often very considerably increased.---There is no reason for believing that any thing is evacuated from the intestines, different from what is evacuated in health.

Every *other* secretion, besides those which have been now enumerated, returns to its ordinary state; and very rarely exceeds it in quantity.

When a crisis takes place in a simple fever, *the feel of obstruction of the Pulse* goes off; but very variously. Sometimes the feel of obstruction begins to diminish at the commencement of the crisis, and does not go off entirely until it is quite complete. Sometimes the crisis continues without any diminution of the feel of obstruction of the pulse, till the sweating has gone on for an hour or two; then goes gradually off; and is entirely removed before the end of the crisis.

The *Frequency* of the pulse continues almost always until near the end of the crisis; and its return to the usual number is often not till towards the end, and after the increase of sweating and other secretions is entirely gone off.---The fulness and strength of the pulse, if they took place, always begin to diminish at the very first beginning of the crisis; and go off before its termination: and indeed towards the end, the pulse becomes weaker than it is in health.

The *Affection of the stomach* and *Depression* about the præcordia begin to diminish at the commencement of the crisis; and gradually continue to diminish, until at last all affection of this kind entirely ceases.---The pain in the forehead begins to diminish at the beginning of the crisis, and is totally carried off before its termination; as is also the depression of muscular strength.

It has already been observed, that this *depression of muscular* *gth* is very different from weakness: but the exertions that aken place during the paroxysm leave the patient exhausted;

so that the force of the system is not felt to revive, till some time after the crisis has been quite completed.---It then often happens, that the patient falls into a profound and quiet sleep; but even after this the vigour of the body is not perfectly restored.

All the other appearances proper to the first stage of the disease are carried off completely; and *then* (or rather somewhat before,) *if there were any increased secretions*, they begin to diminish, and are entirely restored to their ordinary state; so that the health of the whole system is restored perfectly.---If it is not, the disease is not a *simple fever*: for although it happen in compound fevers, that a crisis may take place, leaving some symptoms of the first or second stage, which may go off afterwards without repetition of the fever, yet it never happens in a fever which completes its course so [illegible] as to go through its three stages in eight, ten, or twelve hours, that the disease does not return, if any morbid appearance whatever [illegible] remains after the crisis. I [illegible] the [illegible] in the [illegible] other [illegible] symptoms remaining [illegible] that it is not a simple fever.

[illegible] eight, ten, or [illegible] two, be- [illegible] to [illegible] may continue [illegible] begin [illegible] in [illegible] health. [illegible]

[illegible] crisis, [illegible] from dis- [illegible] ---Its termination in *other* [illegible] observations.

[illegible] the author's observations, are either the [illegible] *or repetitions* of it modified in a [illegible] every inquiry into the history of the [illegible] upon a knowledge of *simple fever*.---Galen is the only writer the author knows of, who has argued whether all fevers are repetitions of simple fever with different modifications.---All the other authors who have treated the subject of fever, have fallen into confusion;---which can only be avoided by a distinct idea of simple fever; a description of which has been endeavored to be given in the foregoing pages.

In future dissertations the author proposes to point out the *manner in which simple fever is repeated*, with various *modifications*; so as to form all the varieties of fever.

A

SECOND DISSERTATION

ON

FEVER;

CONTAINING THE

HISTORY, AND METHOD OF TREATMENT,

OF A

REGULAR *TERTIAN* INTERMITTENT.

—o—

PRINTED IN LONDON, IN 1802.

SECOND DISSERTATION, &c.

The *history* of a fever consisting of *one* paroxysm, (or simple fever,) has been given in the Dissertation already published.

The author in pursuance of his plan, means next to treat of that case of fever recurring by *paroxysms*;—in which each paroxysm goes through its three stages in the space of less than twenty hours; and *returns nearly at the end of forty eight* hours from the beginning of the former paroxysm;—nothing happening here, excepting those appearances which are *essential to the fever*.—A fever of this kind is called a "*Regular Tertian.*"

If a person has never been before affected with an intermitting fever, and a paroxysm of *simple* fever should take place and should terminate in a *complete crisis*; (so that no symptom of the fever is left;) the patient is restored to perfect health:—And the fever does not recur, as far as has come under the author's observation or information.—The person is likewise *not* more liable to be affected with fever from any *new* cause, than if no such paroxysm had taken place.

When a person is seized with a paroxysm of fever, it frequently goes through its stages and terminates by a crisis, in ten or twelve hours;—but there are *left behind* symptoms of the first stage; (such as languor, pain in the small of the back, head-ach, some foulness of the tongue, &c.)—When this happens, sometimes (though rarely) these symptoms gradually diminish and go off; and the patient recovers his health in three or four days.—It much oftener happens, when *symptoms of the first stage remain* after the crisis, (at least nine times out of ten,) that after a certain length of time a new paroxysm of fever takes place; and often at the end of forty-eight hours: and the disease becomes a *Regular Tertian*.

When a person is exposed to putrid or infectious vapor; head-ach, languor, and restlessness, or other symptoms of the first stage of fever often take place; but not to that degree as to occasion a hot fit or second stage.—These sometimes gradually wear off, and no fever arises.—but they also very often increase all at once, and a complete paroxysm takes place several days after the first appearance of these symptoms.—From these observations it is very probable, that *one cause* of the return of the second paroxysm of an intermittent is, that the *Crisis of the first was imperfect.*

If a regular tertian has gone through *many* paroxysms, and in any one paroxysm the crisis is quite complete; it sometimes happens that the disease does not recur:—but much more frequently the paroxysm returns, although there are none of the symptoms left of the first stage or of any part of the fever.

If a person has *formerly* been afflicted with a tertian fever, although he has continued in health for a year; yet if a fever should take place, go through its stages in twelve hours, and no appearance of it continue, but the patient feel himself in perfect health; a new paroxysm of fever shall often take place at the end of forty-eight hours from the beginning of the first paroxysm.—In this case, the cause of the return is probably a *habit* acquired; as we see circumstances often recur, because they recurred before. (A man, for instance, has been accustomed to dine at a certain hour: his appetite returns at that hour: and if he eats nothing, the appetite nevertheless goes off.)

When a paroxysm of fever goes off, leaving *some* symptoms of the first stage after the crisis; it oftener returns at the *beginning of the forty-ninth hour* from the beginning of the former paroxysm, than at any other period.

Much conjecture has been made on the reason *why* a paroxysm of fever should arise at the end of the forty-eighth, or beginning of the forty-ninth hour.—No revolution of the heavenly bodies accords with this period; nor any operation in the body itself. We are left here therefore, as in most other cases of fever, mere observers; without a means of accounting *a priori* for its appearances.

In some cases, a paroxysm returns, and fresh paroxysms continue returning, at the beginning of the forty ninth hour *exactly;* so as to form a tertian perfectly regular.—Paroxysms of fever, (it has been observed in the former Dissertation,) commence much more frequently from eight o'clock in the morning to eight in the evening; than from the evening to the morning.—The paroxysms of a regular tertian follow one another at the time of the day of the coming on of the *first* paroxysm; so that they continne recurring at the time of the day when the first paroxysm took place.—Some have supposed that the sun's passage over the meridian was connected with this return: but the sun's passage is by no means constantly at the same hour, as it *varies from mean time,* from a quarter of an hour earlier to a quarter of an hour later; and this difference has not been found to occasion the least alteration in the returns of a regular tertian.—The paroxysms *do not take place more frequently at noon,* than at any other time between eight in the morning and six in the evening. One that takes place at ten in the morning or three in the afternoon; cannot be connected with the sun's passage over the meridian.—The sun passes it *once in twenty-four hours;* a regular tertian recurs but once in forty-eight.—Should a person afflicted with a tertian travel *east or west,* the sun's passage will be accelerated or retarded; but the paroxysm will return exactly at its usual period.—It is evident therefore that the sun cannot have any effect in re-producing the paroxysms of a regular tertian:—Neither can the phases of the Moon, or other planetary bodies; since their variations are infinitely greater.

Although intermitting fevers return more frequently at the end of forty eight hours, than at any other period, so as to form *regular* tertians; yet they are *not uniformly so exact; having often a latitude* of two hours, sooner or later; (that is from forty six to fifty hours). Twenty fevers at least return at a period between forty six and fifty hours, for one which recurs in a period from thirty six to forty; or at any other period, (excepting at the end of twenty four or seventy two hours).---When a paroxysm of fever does not return exactly at the end of forty eight hours, it often happens that *one* paroxysm recurs at the end of forty nine, the *other* at the end perhaps of forty seven hours; thus continuing to *fluctuate backwards and forwards about* the forty eighth hour; never going two hours from it. (For example, the first paroxysm may take place at ten o'clock on Monday morning; the second at eleven on Wednesday; the third perhaps at half past eight on Friday; the fourth at ten on Sunday: and so may take place between eight and twelve in the morning, during the continuance of the disease.)---These [illegible] been [illegible] by those who have treated on the [illegible] same period.

[illegible] that the fever continues to return at the end [illegible] The former has been called an anti-[illegible] those where the period of which is fifty hours, [illegible] generally which return at any time be-[illegible] hours have been called anticipating; [illegible] eight to fifty hours, retarding tertians.)

[illegible] circumstance the strong in-[illegible] take place between eight at night and six in [illegible] tertian should have its first parox-[illegible] afternoon, its second at noon, its third at ten in [illegible] night. Its fifth will sometimes take place [illegible] sometimes at eight or ten in the evening pre-[illegible] similar in its recurrence. If its first [illegible] happen at ten in the morning, the succeeding ones [illegible] eight. The following one often does not [illegible] eight the next morning.---It is [illegible] never return regularly in the [illegible] more rarely in the night than in the [illegible] ---It is entirely un-[illegible] unless the observation has been lit-[illegible] has not frequently seen the disease. [illegible] similar to the pa-[illegible] difference being, that in a ter-[illegible] not so complete, as to car-[illegible]

[illegible] after the crisis, are [illegible] appearances of it [illegible] so that the practi-[illegible] disease, hardly knows whether the [illegible] Although the tongue has become per-[illegible] natural state, and the patient [illegible] excepting for the languor and pain in the [illegible] almost always returns.—(This languor [illegible] with the fatigue arising from the paroxysm of a [illegible] goes off.) In a simple fever, the patient falls *asleep* [illegible] or immediately after it has gone off; sleeps for two, three, or five hours, if it should not happen to be the natural time of his rest; or during the night if it should; and wakes refreshed and in perfect health: or if he should not sleep, the fatigue of the paroxysm goes off in six or eight hours.—But if after this sleep or time of rest, languor and pain in the small of the back continue; the disease almost certainly recurs.---Sometimes remains of the first paroxysm are *much more considerable;* the depression of strength is greater; there is perhaps no pain in the small of the back, but there is often pain in the forehead; the tongue continues covered with a crust, perhaps not universally, (there being only a little towards the middle or back part of it); the pulse is not uncommonly left with a degree of frequency beyond the natural state; the skin, after the sweating is over, feels dry and uneasy. Sometimes other symptoms of the first stage remain, even when there is a regular crisis. There are all the varieties, in the beginning of the disease, between the crisis being not completed before the next paroxysm takes place; and there being only some degree of languor and pain in the small of the back.

When there is a regular tertian, in which *several* symptoms of the first stage remain after the crisis at the beginning of the disease; *as it goes on,* the intermissions become gradually more and more perfect; (or rather the crisis becomes more and more perfect.) This happens with considerable variety.---When in the first crisis of the disease, there is *only* languor left and a pain in the small of the back; frequently the next crisis is *by no means so perfect;* but head-ach, foulness of the tongue, and frequency of the pulse remain after it.---Even the next crisis may be still more imperfect: but after that, the crises become again gradually more complete.

It happens not uncommonly, that there is *no crisis* after the first attack of the fever; but a *second attack takes place* before the first paroxysm is much diminished; (so that the disease at first puts on the appearance of a continued fever).---In this case, the subsequent attacks are often in the fore part of the day; or if they should come on at the time of the ordinary returns of a continued fever, (which are in the evening,) they observe the tertian type: in either of which cases, we may expect in a tertian period or two, first an imperfect crisis, followed gradually by more perfect ones; *till all the crises are at last complete.*---When the crises are very imperfect at first, they almost always grow gradually more perfect; until it often happens, that they become so perfect, as not to leave behind the least vestige of the disease.---That is, during the interval of the paroxysms, the appetite returns with the vigor it would have done in health, digestion goes on, sleep takes place at the usual period and with the wonted degree of refreshment, the head is clear, and the patient is as capable of managing his affairs as when in his best state; is as capable of bodily exercise; and, if he commits any irregularity, (such as drinking too large a quantity of wine, or eating food of too difficult digestion,) provided the effects are gone off before the next paroxysm takes place, they produce no greater derangement than they would in perfect health.---This happens only when the tertian is *completely regular*.---Many practitioners have been in situations where they may never have seen a perfectly regular tertian; while others may have seen many hundreds.

These perfect intermissions *continue some length of time*.---Perhaps the intermissions may become quite perfect at the end of three weeks; and continue so for about *six weeks, or two months*.---If they are perfect, and if the patient be managed properly; no debility in the system will take place.*

After this period, the intermissions become *again* more imperfect. (That is, the sweating in the crisis is not so profuse; there is not much lateritious sediment in the urine; the bowels do not return so much to their natural state; and a degree of languor, want of appetite, and imperfect sleep take place.)---But on the other hand, the attack is *much less severe*; that is, if in the former paroxysms there were languor and feel of coldness, head-ach or delirium, these symptoms are diminished: if nausea and vomiting, the vomiting ceases and there is but little nausea. The patient is by no means so much fatigued after the paroxysm is gone off: and thus the disease gradually abates for the space of *two, three, or from that to six weeks*;---at last, leaving the patient entirely;---But for the most part leaving him weakened. (He has less power of exerting the faculties of his mind, and of going through bodily exercise; is subject to flatulency, and incapable of perfectly digesting his food.) These consequences go off after some time, and he often becomes more vigorous even than before the disease took place.

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* It is wished to keep this Dissertation strictly to the regular disease; as treatises upon it have been generally confused by the introduction of anomalous appearances. A.

The *Whole* therefore of the disease naturally occupies about *Four Months.*

During this progress of a very regular tertian, it sometimes happens (although rarely) that at some time of the disease, the patient is seized with a *much more violent paroxysm:* (he is attacked with a considerably greater degree of cold; more violent head-ach; greater foulness of the tongue; dryness, and parchedness of the skin; sickness; and delirium.)—This is followed by more profuse sweating; all the other critical symptoms take place more perfectly; and no future paroxysm arises.—This occurs much more rarely in a regular tertian, than when there are irregular appearances.

It has been often observed, that regular tertians *clear the constitution of all other diseases;*—and certainly on a good foundation.* If a person, for instance, from twenty five to forty years of age, should be afflicted with *rheumatism,* which is become *habitual,* and a regular tertian should take place; after it has gone through its course, the rheumatism no longer recurs on the same exposure to cold or moisture, (as it would have done if no such disease had taken place.) If a person has been subject to *indigestion,* flatulency, or disposition to acidity in the stomach and intestines; yet after the tertian has gone through its natural progress, these appearances in the intestinal canal no longer take place. Sometimes, *habitual inflammation or cutaneous eruptions* leave the patient during the course of a regular tertian, and do not afterwards return; although this more rarely happens than in other habitual diseases. So *epilepsy, hysteric* affection, and all *other* diseases which have become *habitual,* are in many instances removed.—In many of these cases, however, no alteration is made by a tertian; but it likewise happens, that such diseases are *alleviated,* although not entirely carried off.

It must be remembered, that we are acquainted with every thing relative to matter, whether animate or inanimate, only by experiment.—Yet Hippocrates, his great commentator Galen, Sydenham, and many others have asserted; that the powers of the heavenly bodies on disease were considerable in regulating its progress and termination; without any proof from experiment or observation.—Many also have said, that diseases originated from variation in the properties of the blood or other fluids. This assertion depended so little upon experiment; that Hippocrates, Galen, and Sydenham, with other great practitioners, did not even know that the blood consists of red particles, coagulable lymph, and serum: much less had they examined the variations that take place in it or in the other fluids, in a healthy state, during disease, or after its termination.—Whatever they have said on this subject is of no more authority, than what is said of the terra australis incognita, or any other dream. ---It is found on the contrary by experiment, that the *blood* of a man afflicted with a regular tertian, *seldom differs* from that of a man in the most perfect health: This the author has frequently ascertained by minute examination.* Neither is there any difference in the appearance of any of the *solids or fluids* of the body, during or after the disease; (excepting that the tongue, during the paroxysm of a tertian, is covered with the crust described in the former dissertation; and a lateritious sediment in the urine takes place in the crisis, which consists of matter found in the urine of a man in health). After a tertian has gone through its regular course, no difference in the blood has been found upon the investigation of its properties, or in any of the other fluids, from those found in a state of perfect health.---The Author has therefore never seen, nor can he himself conceive any *Cause*, why a simple paroxysm of fever should go through its three stages, and terminate in health; much less why a regular tertian should begin, grow gradually more perfect, continue for some time in vigor, then gradually decay and go off: nor (after so many conjectures which have been thrown away on this subject,) does he expect that the cause of this will be known in his time.

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* The author frequently touches upon this subject under some form or other.—It may be queried however, whether the abstinence or other remedies sometimes employed for the cure of this disease, as well as an increase of prudence in the patient, do not contribute to the establishment of good health in general; for it is what occasionally happens in the case of some other diseases.

The animal and vegetable creations are destined to be continued by the *succession*, not by the permanence of individuals.---In man, this law is more perfect than in any other animated being. He grows up from infancy, so as to acquire perfection by degrees; both in his corporal and mental faculties. These continue some years in their greatest perfection, and then necessarily fall into decay; which decay is often rendered premature by disease.---It would seem that acts of violence sometimes will restore its vigor. Fever thus, and even other violent diseases, (which go on in a similar manner) proceeding through their natural course, often leave the patient free, not only from the disease itself; but also from the decay arisen from some less violent disorder, that had not in itself a *natural* progress and termination in health.—Probably, the manner in which this happens will ever remain inexplicable.

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* The properties of this fluid are related (as found by experiment) in the Author's Elements of the Practice of Physic. A.

Regular tertians, the paroxysms of which are terminated in less than twelve hours, (returning from forty six to fifty hours,) are very *rarely fatal in temperate or cold climates*.---When they destroy, it is by a violent attack of the cold fit (which does not happen once in a thousand cases); or by weakening the patient.

Many practitioners therefore, considering how rarely regular tertians are fatal in temperate or cold climates; and that when they have gone through their natural course, patients are left in more perfect health than before their commencement; have thought it better not to risk the application of any *Remedy* which may have a tendency to cure it; lest the disease should be disturbed, and its salutary effects be prevented.---There have accordingly been *two opinions* respecting the treatment of this malady: one, that it should be allowed to go through its natural course; the other, that remedies should be employed to shorten and carry off the disease.

It is meant, first, to inquire into the practice to be pursued, where medicines (having a tendency to check the natural period of the disease) are *not* applied; and afterwards, to examine into the effects of those remedies which *have been* employed to put a stop to or shorten the period of the disease.

If the practitioner be of opinion that a regular tertian should go through its *natural course;* his only object must be to avoid, during that course, every circumstance that can *disturb its progress*.---With this view inquiry must be made, as to what in the ordinary mode of living or peculiarities of the climate, or what accidents, may disturb the natural course of the disease.

The attention is first drawn towards the employment of proper *Food*, and at proper times; (both as it is generally known, that a certain quantity of food excites disorder in a man in health, especially if of particular kinds; and as practitioners find the system extremely disordered by exhibiting food in certain quantities or of certain qualities, during fever.)---Were a tertian to consist of two paroxysms only, it might not be necessary to employ any food whatever; but as the disease continues many weeks, sometimes to the end of the fourth month; it is absolutely necessary, that nourishment should be given. (For although total abstinence has been practised by the Jews for six days, both from food and drink; and although men have sometimes existed twenty days upon water alone; yet in both cases they have been so excessively reduced, as to shew, that forbearance from proper nourishment can never be hazarded for any length of time.)

Two things must be attended to in the application of food in a regular tertian: First, the *times* of the periods of a regular paroxysm and intermission, in which it should be used: Secondly, the *qualities* of the substances employed.

It must occur to every practitioner, that the *digestion* of the food and the *paroxysms* of the fever, should be entirely *gone through at different times*; so that the one may not interrupt the other:---for it is known from experience, that digestion of the food does not take place so well during the paroxysm of fever, as when no paroxysm is present; and that the paroxysm is itself disturbed by the digestion, and prolonged by it, and the crisis rendered more imperfect.---It is therefore obvious that the digestion of the food should be kept as distinct as possible from the paroxysm of fever.

In the Treatise on Digestion by the Author, it has been shown, that it is *natural to man to make only one meal in the day*, (i. e. in twenty four hours;) the additional ones being merely the effect of luxury.---The time of the principal meal, has been fixed by the habit of various countries and different ages, to almost every part of the day; sometimes even in the night; and this without any great inconvenience.---In a *tertian of forty eight* hours, there ought to be *two of these meals*.---*But* as a tertian takes place most frequently between eight in the morning and six in the evening; and as the digestion of food requires eight hours; the paroxysm must interfere on the day in which it takes place, with the accustomed time of the principal meal: (for supposing the paroxysm to take place at eight in the morning, it will be at least eight in the evening before it is completely terminated; and supposing the ordinary time of the principal meal to be eleven in the morning, it will be seven in the evening before the digestion of the food is perfected.) If the patient should continue his ordinary habits, there would therefore be only time for *one meal* in forty eight hours.

The *time* at which the patient has been accustomed to eat his principal meal, is the most eligible. (At that hour the patient grows hungry by habit; and if it should be passed over without eating, his appetite is lost; and in consequence the digestion does not take place so perfectly.)---This happens more particularly, when it has been usual to observe the time strictly; (so that in some persons, nausea and many disagreeable appearances arise; both from omission of food at the usual time, and from the exhibition of it at any other hour.)---In such cases, therefore, it is a question whether it should be administered in considerable quantity, only on the *intermediate day* between the paroxysms; or whether the *hour should be altered*.---When the patient has *not* been tied by habit to one particular hour, it is better perhaps to alter the time; and give *two* principal meals: (one so as to be *eight hours* before the paroxysm begins; the other about *sixteen hours* after the paroxysm has gone off.) But when the time of the principal meal *has* been nearly defined by habit, (as is generally the case,) there should be only *one* principal meal in forty eight hours, at the usual time of the intermediate day; —and smaller quantities of food should be employed during the twenty four hours, in which the paroxysm takes place, (counting from midnight);—not however, nearer to the paroxysm than *six* hours *before* it comes on; nor solid food sooner than *six* hours after it has entirely ceased.

The *quality* of the food to be used is to be considered with relation to the different states of the disease.

When at the beginning of a regular tertian, there are only remissions or very imperfect intermissions; (the tongue being covered with a crust, and frequency of the pulse, head-ach, and other symptoms of the first stage, remaining after the paroxysm, and during the whole intermission): the food employed should be such, as will produce no disturbance in the system during its digestion.—If the patient be moderately strong, (which generally is the case,) very little nourishment is required. In this case too, *no principal meal* should be given.

Farinaceous matter is the food best adapted to the organs of digestion of the human body.—When separated from the other juices [illegible] of vegetables [illegible], it is called starch: and in this [illegible] and loses the disposition to enter [illegible] in the stomach, necessary for its conversion [illegible].—If it is mixed with water without coagulation, it forms a viscous [illegible] mass, difficult of digestion; but if coagulated, and then mixed with water by boiling, the solution is much [illegible].—When naturally mixed with the juices of vegetables, it enters readily into the [illegible], vinous, and acetous fermentations;—and in this case great difference arises from the juices with which it is combined. When found in the roots of plants, (such as potatoes, yams, &c.) it is more apt to fall into fermentation; and is [illegible] more flatulent and laxative; (qualities that render it improper in the state of a fever at present treated of).—It is less disposed to enter into these fermentations, as it is found in the seeds of the gramina and is better adapted to this state of the disease.

Of the seeds of the gramina, rice contains (in an equal bulk) a greater quantity of farinaceous matter, than any other of the seeds of the gramina. Before it is employed, its husk is entirely taken away; (which should always be the case with the *other* farinaceous seeds, when given in fever). It is believed that some astringent matter is contained in the seed itself; and certainly it is of less easy digestion than others of the grains, which have not the farinaceous matter so firmly compacted.---*Wheat* is abundant in farinaceous matter in the next degree; and *millet* differs very little from it: *rye* and *barley* are rather more prone to fall into the vinous and acetous fermentations: while *oats* and *maize* contain the farinaceous matter less pure, and have been supposed to stimulate the system during their digestion.---These are the seeds of the gramina usually employed in Europe. They all appear to be proper food, in this state of an intermittent; and better adapted to it, than any *other* species of nourishment.

Coagulation of these seeds is indispensably necessary before they are used.---It has been obtained by applying heat to them; or alkali, alcohol, or some other coagulating substance.---In this state of fever, coagulation by heat is alone proper. Heat may be applied, so as to coagulate these seeds; by breaking them down into gross powder, and exposing them to a heat of 212°.---Another mode is, by boiling them a quarter of an hour in water; (throwing the water away, [illegible] parts that might have been dissolved before they were coagulated, as well as matter accidentally mixed with it.)---They may afterwards be *dissolved*, by being boiled in water; or used *whole*.---Another mode has been to form them into *thin cakes* with water; and expose them to a heat somewhat more than 212°. But this is to be rejected; as it forms them into too compact a mass, which cannot be easily penetrated by the juices of the stomach.

The *gas* produced during the fermentation of *bread*, and expanded by the heat of baking, leaves the whole mass very porous; and therefore easily capable of absorbing the watery juices of the stomach. It also increases the coagulating power of heat.---As large masses of a mixture of farinaceous matter and water fermenting, are often exposed to a much greater heat than 212°, the interior parts are not sufficiently coagulated; while the outer are beginning to be decomposed or burn. For this reason, such masses are often cut into slices, and baked a second time; in order to perfect the coagulation. This preparation was called by the ancients, *panis biscocta*.*

In a temperate or cold country, when the patient is strong, and there are only *slight remissions* at the beginning of an intermittent, or it puts on the appearance of a *continued* fever, (excepting that the exacerbations do *not* take place in the evening,) it is not necessary to give great nourishment; yet some is absolutely necessary.---The Greek physicians plainly appear not to have allowed any *food or drink* whatever, on the first days. This seems improper; for if no watery fluid were exhibited, the proportion of fluids in the body would probably be too much diminished by the vapor which flies off from the lungs and other external surfaces of the body; and by the necessary evacuations. Accumulation of sea salt could not take place, if neither food nor drink were thrown into the body: but common sal ammoniac and phosphoric ammoniac, are continually forming by processes, which seem rather to decompose, than to produce blood or the other fluids; and would be accumulated.---Yet these might not be detrimental; as water might be formed by the same decomposition; so as to render their solutions equally dilute.---Neither the solids nor fluids indeed of a *living* body are subject to putrefaction: Yet some portion of the fluids or solids, or both, seem to verge so near to putrefaction; as to be converted into mucilaginous matters, which are constantly washed off by the watery secretions. Were the quantity of water diminished, they might not be carried off; but might go still farther on to putrefaction: producing salts and vapors which might be pernicious.---On this account it may be necessary to throw *watery fluids* in this case of the disease, into the blood-vessels.

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* From *bis-cocta* comes the French term, *bis-cuit*.

When the remissions and intermissions of fever are very imperfect, or when the disease at the beginning puts on the appearance of a continued fever, (only that the exacerbations do *not* take place in the evening;) perhaps it is not necessary that much *chyle* should be formed; because when the intermissions become more perfect, there will be time for food of greater nourishment to be digested, without interfering with the paroxysms of the disease.---Nourishment may therefore be out of the question at this time of the disease.

One symptom which takes place in this case of fever, is great *Thirst:* that is, a natural desire to throw a quantity of watery fluid into the stomach.---It seems to have been an idea of many physicians, that every natural appetite should be resisted; but in disease it is certain, that the natural appetites are often the best guides. ---It is true there are some exceptions to this; as, in the case of difficulty of breathing from inflammation of the lungs, when the patient wishes to be exposed to a blast of air; (which in a cold country is certainly noxious, although a free air might be proper in a warm country).---The *loathing* of all kinds of *animal* food at the beginning of an intermittent, when the intermissions are very imperfect, points out that such food should not be exhibited; and the *desire for drink* indicates that drink is proper.---It was said indeed by a Greek physician, that thirst would sooner go off, if none were employed. Upon trial, this is not found to be the case: If no drink is used, the patient is uneasy, much more restless, and the intermissions are longer in becoming perfect. (It seems indeed that this was the opinion of but a few; and that the practice was by no means extensive among the ancients: and it has hardly ever been adopted by modern practitioners).---It may therefore be concluded that *some* watery fluid should be exhibited.

If the disease does *not intermit at first,* (but is known nevertheless to be the beginning of an intermittent;) it is not necessary that the patient should have any thing exhibited that will form chyle or blood; because there will soon come a time in which nourishment can be exhibited, without the disturbances arising from the process of chylification interfering with the paroxysm of fever.---In this case therefore *water alone might be thought sufficient;* if the matter were taken *a priori.* When water alone is drunk, the thirst is not found to be much diminished: perhaps mere water is absorbed quickly: certainly it passes off by evaporation from the skin and the surface of the lungs, and by the kidneys, nearly as pure as when it was thrown into the body; and leaves the patient almost in the same circumstances, as if he had not drunk it, in respect to his feeling.---If a *little farinaceous matter, after it is coagulated, be dissolved in water and given for drink;* the same sudden evacuation of the water does not take place. The farinaceous matter seems, (while undergoing the first process of chylification,) to arrest the water in the stomach, and apparently too in the blood-vessels; so as to prevent its being thrown out by the secretory glands: as it is certain that when such a solution is drunk, the secretions from the skin or by the kidneys, are neither so copious nor so watery; and thirst is better allayed than when water alone is drunk.---The solution generally used is of *barley;* which may be rendered more palatable by the addition of a small quantity of the juice of some acid fruit.---The seeds of any *other* of the gramina may be employed with equal advantage.

If a patient of a moderate degree of strength, between the ages of ten or twelve, and forty five or fifty, should be seized with an intermittent, and the intermission should *not* be perfect; he should be kept the first three or four days on this kind of food only.

Where intermissions or remissions at the beginning are *more* perfect; farinaceous matter coagulated, and boiled until nearly, but not entirely dissolved, may be used.---And where remissions continue *very* imperfect *beyond the third or fourth day,* food of this kind becomes necessary.---It appears from Galen, that the Greek physicians were extremely careful with regard to the degree in which farinaceous seeds *ought to be boiled.*---But much depends on the state of the *stomach of the patient.*---(Strong digestive powers would soon pass a solution forwards from the stomach through the pylorus, which a less vigorous stomach could not bear or could hardly digest.)

Sago, (a preparation of farinaceous matter contained in the pith of a palm tree,) may be considered as next in point of facility of digestion; and may be given where a greater degree of nourishment is wished, than is found in barley water.

[illegible] is also a nourishing food [illegible].

[illegible] of the farinaceous seeds of the gramina, (barley, for instance,) may be boiled first in a little water: and the water being thrown away and fresh added, it may be boiled until it is *almost entirely dissolved*; or it may be boiled until it is *softened*; and may be mixed with raisins or other such *dried fruits* towards the end of the boiling.—Such fruits, as are not apt to become flatulent or acescent, such as grapes, figs, peaches, apricots, oranges; or baked fruits, as apples, &c. may be used at the beginning: when there are crises, but the crises are imperfect.—No food of more difficult digestion should be employed, until the crises and consequently the intermissions shall have become tolerably perfect.—When they are but imperfect in a certain degree, that is, when there are still languor, some heaviness, &c. after the crises, milk and animal broths may be added to these.—When the crises are quite *perfect*; *solid animal* food may and ought to be employed on the intermediate day, at the time of the principal meal. On the day on which the *paroxysm* takes place, foods of easier digestion (as above enumerated), but nothing solid, should be thrown into the stomach, for six hours before the paroxysm, nor till the crisis is completed.

Lamb and veal have this advantage over other meats from quadrupeds: that the flavor depending on the essential oil of the animal is not so strong; and, provided they are fat, they may be employed advantageously.

Many practitioners have in all cases objected to the use of expressed oil as food: but it appears to have arisen merely from the superstition of avoiding what is grateful to the palate.—Expressed oil, when eaten alone, produces a sense of weight in the stomach, a degree of sickness and that particular sensation called cloying; none of which occur when it is mixed with *farinaceous or mucilaginous* matter.—It takes off the adhesiveness of these; as also of the juices of young animals: and fat is less prejudicial in them than in older animals (in whom it has acquired a strong flavor).

The *older animals of the same species* are better employed in broths: taking care to let them cool; that the expressed oils (which contain the essential or flavored oils) may be carefully taken off and removed.—Such broths are *less adhesive and glairy*, than those from young animals.

Rabbits are also proper; but their muscular fibres not being interspersed with expressed oil, are *adhesive when young:* and therefore such as are of a year old at least, ought to be chosen.---From these *examples* it may easily be judged what other kinds of animal food from quadrupeds are proper.

Those *Fishes* are eligible whose flavor is *not* considerable, (generally such as are of a white color;) and such as are *not* adhesive, but of a *certain degree of firmness;* (whitings for example, haddocks, flounders, and turbot.)---Those which give a *gelatinous solution,* (as plaice,) should be rejected; and also others, (as soles,) which from their *firmness* are of difficult digestion; but most of all, *highly flavored* fishes.*

Shell-fish of all sorts are of very difficult digestion; and ought even to be rejected where the intermissions in fever are very perfect.

Milk, where it is not coagulated *too firmly* by the strongly coagulating juice of the stomach of *adults,* is proper; but ought *never* to be coagulated before it is thrown into the stomach.---All *other* animal food should be coagulated by *heat.*

Birds, as several species of the gallinæ and passeres of Linnæus, (such as the common fowl, pheasant, peacock, guinea-hen, partridge, quail, common sparrow, &c.) may be used.

The empyreuma acquired by *roasting or baking of meat,* renders it difficult of digestion: it should therefore seldom be employed in this way: but it should be perfectly *coagulated by boiling,* &c.; (which is more particularly necessary in the older and high flavored animals.)

Frying is an extremely improper mode of coagulating food; the original flavor being entirely retained; and a considerable degree of empyreuma acquired.---So that this mode ought never to be employed.

Broiling, (if the food is *not high flavored,)* is often very proper; supposing the food to be broiled is *thin.*

A *variety* of different substances for food have thus been enumerated (and even those only as *examples,)* that the practitioner may not only be able to adapt the food to the powers of the stomach; but that he may be likewise able to allow a greater variety of food when the patient requires much nourishment; (i. e. when the intermissions are become perfect, and the disease is going through its natu-

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* It is singular that the author does not forbid the skin and fat of certain fish.

of eminence; and would be improper in a disease of shorter continuance than three or four weeks.---It is at present supposed, that the tertian is to be suffered to go through its natural course; and in this case in four months, the strength would be entirely exhausted, were a small proportion of food only to be used and that of the least nutritive kind.

The other meals, (such as breakfast and supper in this country, and breakfast and dinner among the Romans,) should be kept totally clear of the paroxysms; and consist of foods easily digestible. No animal food should be allowed, but only vegetable; such as farinaceous matter; and fruits not much disposed to ferment by the vinous or acetous fermentations, nor prevented from fermenting by drying or exposure to heat.

An example may be given in a regular tertian; the paroxysms of which take place at ten in the morning; and where the intermissions have become regular and perfect.---On the day on which the patient is perfectly free from the disease; breakfast in the morning may be, (where the patient is accustomed to it,) tea with milk and sugar, and bread with butter not rendered empyreumatic by heat. The dinner may be soup, fish, and meat, with fruits; (all of the kinds enumerated;) but this variety is to occur only where the patient has been accustomed to it.---The supper may consist of potatoes or rice, and milk, sago, or other things of the same kind; with a moderate quantity of wine, [where wine agrees.]

If the patient should sleep during the night before the paroxysm, nothing but a basin of barley-water should be given at six or eight in the morning. If instead of ten, the paroxysm should come on at twelve, or later; tea with bread and butter, or other such food, may be given at eight in the morning. If the paroxysm should take place at ten, it will probably go off by eight in the evening; and the patient when he feels easy, should eat sago, barley boiled down with a moderate quantity of wine, and bread with milk, &c.

When intermissions again become irregular, towards the end of the disease, no solid animal food whatever should be employed; but only such articles as are proper at the beginning of the disease, though in more liberal quantity.

To conclude; for the first fortnight, food of easy digestion should be used; afterwards, more nourishing food, according to the perfec-

[illegible] digestion, when [illegible]

[illegible] is indigested [illegible] as not to be [illegible] indigested matter [illegible] where it be- [illegible] and acts as [illegible] lightest food; and [illegible] and contin- [illegible] remains [illegible] and pre- [illegible] otherwise [illegible] vomiting which [illegible] clear the [illegible] the usual vom- [illegible] administering [illegible] matter has been thrown [illegible] when the [illegible] too short for [illegible] suppose that [illegible]

[illegible] should again [illegible] itself of the [illegible] matter from the du- [illegible] emetic should be [illegible] on the day on [illegible] there are no other [illegible] advisable to ex- [illegible] should con- [illegible] the patient lived [illegible] necessary to [illegible] in the stomach pro- [illegible] eructations; [illegible] the tongue.---It is [illegible] matter is considera- [illegible] a fluid may disagree as [illegible] and prevent the [illegible] the digestive fermentation shall not go on properly. If the very small portion, which may act as a ferment, be considered; it will appear how small a quantity may affect the digestion: and in consequence the patient may be relieved by the emetic, although no great quantity of matter be thrown off from the stomach.

If the emetic be exhibited before the food has had time to pass down from the duodenum, it may cause it to be regurgitated, and so thrown off: or if the last meal has passed down from the duodenum; the emetic may occasion a quantity of bile, pancreatic juice, and the other fluids secreted by the glands of the duodenum, to be secreted and regurgitated into the stomach; in which case the patient appears to throw a great quantity of these substances from his stomach.---These would not have been there, but for the exhibition of the emetic:-(this is proved in the sickness produced by the motion of a carriage, to those unaccustomed to it, and in sea-sickness; where a great quantity of bile, pancreatic juice, and the other fluids, secreted by the glands of the duodenum are thrown up; though the stomach may have been perfectly empty before the agitation.)---Therefore as it does not follow, when a small quantity is thrown up in consequence of an emetic, that no noxious matter was contained in the stomach; so neither when bile, pancreatic juice, &c. are thrown up, does it follow, that they were contained in the stomach or in any cavity, previous to the exhibition of the emetic; but that a secretion might be occasioned by the emetic, which would not otherwise have taken place.---When the emetic is not exhibited till eight hours after the principal meal, if part of the food is thrown up undigested, it certainly shews a deficiency in the digestion.---Whether it remains at this time in the stomach, or duodenum, it is equally noxious; and should be a cause of preferring lighter food.

It happens also frequently, that a kind of *slime* forms in the stomach in intermittents, which seems too tough to be carried through the pylorus, and not capable of undergoing the digestive process in the stomach. This produces the same or even worse appearances than undigested food, even if in small quantity; and is another cause of the necessity of exhibiting emetics.

It is by no means equal, what means are employed to produce vomiting; but that will be treated of afterwards.

When an emetic is employed for the above purposes, it is necessary that the patient should drink some warm watery fluid; to take off the stimulus of a vain attempt at evacuation. This vain attempt happens, when any moving part exerts itself to throw a substance out of a cavity which cannot be evacuated by the effort; or when an effort is made when nothing is contained there: pain and other effects of stimuli being produced. The patient should drink half a pint of warm water; and when the fit of vomiting is over, another half pint;---but if no third paroxysm of vomiting should take place, warm water is not to be given to excite it.—But if in the second fit of vomiting a quantity of solid or undigested food should be thrown up, a third fit should be excited in the same manner as the second; which constantly clears the stomach of all noxious matter, remaining from indigestion: therefore it is no longer necessary to drink more than a sufficient quantity of some fluid, to wash the throat and mouth.

To *recapitulate* what we have said with respect to the proper food, and rendering the stomach fit for its digestion:—The only food proper, where the disease puts on the appearance of continued fever at the beginning (excepting that exacerbations do not take place in the evening,) are solutions of farinaceous matter.---Where there are crises at the beginning, although very imperfect, farinaceous matter in substance (coagulated, and boiled down again until soft) should form the nourishment.---If the crisis at first should be nearly perfect; the food during the first, or even second week, should be farinaceous matter, and fruits. But in the second or third week, if the crisis should become perfect, or nearly so; milk not coagulated, and animal broth, may be at first added; and sometimes solid animal food of easy digestion.---When the crisis becomes perfect on the day on which the paroxysm does not take place; food, according to the state of the patient, should be exhibited nearly in the same manner as in health---No solid food of any kind, and of fluids only solutions of farinaceous matter; should be allowed, for eight hours, before the coming on of the paroxysm.---After the paroxysm is over; farinaceous matter in a solid form, broths or milk, may be made use of on the day of the paroxysm:---And finally, the stomach should be kept free from noxious matter by emetics.

The state of the *Intestinal Canal* requires particular attention.---In a regular tertian, where no accident takes place, the peristaltic motion goes on with tolerable regularity; excepting during the paroxysm.—Sometimes however, the want of peristaltic motion, or the diminution of it, which takes place during the paroxysm; does not go off immediately after the crisis, when the crisis is incomplete.---In this case, so far as it affects the intestinal canal, laxatives must be employed, to prevent the retention of feculent matter in the intestines; (for if any remains when the next paroxysm comes on, the whole system is greatly deranged by it; and an imperfect crisis is often produced.)

Some practitioners have supposed that this disease depended on a *humor*, which might be evacuated by purgatives.---They have not however shown from experiment, that any humor, (that is to say, any fluid or even solid, possessing noxious qualities,) existed in the system. This opinion might be overlooked as mere hypothesis, were it not to warn young practitioners against the employment of purgatives in regular tertians; (excepting to produce regular evacuations;) as they tend to create irregularity and accidents in the disease.---The author has seen instances of the reproduction of the disease, after it had been carried off naturally, or by remedies; by the use of a purgative: and there are many such recorded.---This subject will be more fully treated of afterwards.---All to be done then is to take care that no feculent matter is retained in the intestinal canal; and this should be prevented by employing the most gentle laxatives.

Purgatives are of several descriptions.---There are some that stimulate the orifices of the excretory ducts of the glands of the intestines, and by that means produce a copious flow of watery fluids; (that is, principally of superfluous water, with the salts, and putrescent mucilage of the blood: these fluids, by their quantity and possibly by the stimulus of the salts contained, increasing the peristaltic motion of the intestines; and yielding copious watery evacuations.) Neutral salts are purgatives of this kind; for instance natron vitriolatum, and natron phosphoratum; as are likewise salts consisting of acids and magnesia, as magnesia vitriolata; likewise solid acids that require a great quantity of water to render them fluid, as tartar, &c. These affect the intestines only, and hardly produce any alteration in the general system; they are however, not proper for the present purpose: copious evacuation is not wanted; but simply that noxious matter should be evacuated.—There are several purgative juices principally contained in fruits, or the flower-leaves of flowers. It has not yet been ascertained whether they contain one substance or several. This substance is contained in tamarinds, prunes, cassia: the like kind of purgatives is also contained in the flowers of the damask rose, of violets, in manna, &c. These have a kind of mixed operation: they partly stimulate the ends of the excretory ducts of the glands, opening into the intestines; and partly tend to increase the peristaltic motion of the intestines: but they rarely have any effect on the system generally. These are apt to produce flatulency. These would be more proper than the class first enumerated, but they are too uncertain in their operation to be depended upon.—There are purgatives which increase the peristaltic motion of the intestines alone; and occasion the contents of the intestines to be sooner carried downwards and evacuated, having at the same time little or no tendency to increase the secretion, excepting accidentally; (as rhubarb, sulphur, &c.) If not given in too large doses, these have no effect on the system generally: if given in too large doses, they occasion spasmodic contraction of the intestines, and consequently griping pain; and by that means affect the system generally. If however, twenty five grains only of rhubarb, or a drachm of sulphur, should be employed in adults, they will commonly have sufficient effect: and neither [illegible], griping, nor affection of the system will be produced. ([illegible] as jalap, scammony, colocynthida, and the like,) which [illegible] they act on the intestines, make an impression on the whole system, are certainly improper.

The [illegible] effects are actually produced by these different kinds of purgatives, as is shown by employing them on a man in perfect health. [illegible] a man in perfect health an ounce of natron vitriolatum, or any other of the first kinds of purgatives in a proper dose; dissolved in [illegible] ounces of warm water, to prevent them from affecting the stomach too much, in two or three hours a copious watery evacuation shall take place, and be followed by three or four others, and the whole effect of the medicine be gone off in four or five hours, without hardly any griping, or any alteration of the pulse, or any other operation on the system.—Give a man also in perfect health an ounce of the pulp of cassia, or any of the purgatives of the second class, in five or six hours after, griping, flatulency, and [illegible] of the bowels, with a half watery, half feculent flatulent evacuation shall take place, followed by borborygmi; and one or two evacuations of the same description.—Give to another man in health, twenty five grains of rhubarb; in two or three hours afterwards he shall feel a disagreeable sensation in his bowels, followed by some griping; and soon afterwards a copious feculent evacuation shall take place; (perhaps a second one of the same kind;) the person not feeling any other affection of the system, nor any frequency of the pulse.—Give to another person in health, fifteen grains of jalap; in an hour or two he will feel uneasiness in his stomach; a disagreeable sensation all over his body; the pulse will be quickened; and (with perhaps less griping than when the cassia or rhubarb were exhibited,) three or four copious watery evacuations shall follow afterwards; with moisture on the skin, or sometimes copious sweating.

Indeed it is possible by mixing the different species of this fourth kind together, and exhibiting small doses, to produce the effect, without making any great impression on the system: but it is unnecessary to have recourse to them, when there are a sufficient number of the proper kind.—Generally great advantages are derived by mixing different species of purgatives together; but this disquisition would lead to too great a digression in this place.—We may only notice, that for the purpose of keeping the *primæ viæ* clear of feculent matter in regular tertians, it is better to mix rhubarb, sulphur, &c. together; than to exhibit them singly.

When laxatives are employed, their operation should be entirely over, and the intestines perfectly quiet; before the commencement of the next paroxysm.—When those only which increase the peristaltic motion are exhibited, it is long before their effect has entirely ceased.—Therefore, when it is necessary to employ them, they should be exhibited at least eighteen hours before the succeeding paroxysm is to take place.

Excepting at the beginning of the disease, no purgative should be exhibited, without there be costiveness or disorder of the intestines.

When a tertian begins without any crisis, but nearly similar to a continued fever; it sometimes happens that the exacerbations take place in the morning, and relaxations at night:—sometimes the exacerbations take place in the evening, in the same manner as in continued fever.—In the first case, the *Time of Relaxation* is the ordinary *Time of Sleep*; and the patient sleeps tolerably well during the night: but in the *second*, the exacerbation being at its greatest height at the hours of rest, the patient is *prevented from sleeping*.—It is *not proper in either case to employ opium*: the sleep it produces under these circumstances being restless and unrefreshing.

When the paroxysms and remissions of a regular tertian become perfect; if the paroxysm should happen at ten in the morning; the first stage continuing an hour, or an hour and an half; the second two, three, or four hours longer; and a crisis should then take place, with profuse sweating towards the middle or end of the crisis: the patient falls into sleep from the fatigue of the paroxysm; sleeps an hour or two, during which time the crisis terminates; and generally wakes languid. If the intermission is perfect, he sleeps sound during that night; (commonly sweating during the course of it;) and the next night he sleeps nearly as in health.—If the paroxysm should take place at four in the evening; the first stage continues till six, the hot fit continuing till ten. Should the crisis come on at this time with profuse sweating, the patient commonly falls asleep about twelve or one; and sleeps without intermission the whole night; waking with some degree of fatigue, which however goes off. The sleep is natural, or nearly so, on the succeeding night.

Should sleep either not take place, or be very restless; the practitioner is to attend to any accidental cause; (as improper food, or feculent matter contained in the intestines).—These apparent causes ought to be removed before opium is employed; (otherwise the sleep produced by it will still be restless and unrefreshing.)—If want of sleep or unrefreshing sleep should take place, without any such apparent cause; opium may generally be employed advantageously during the whole time that the intermissions are regular and perfect.---About two thirds of a grain is usually a proper dose. The operation is rendered more effectual, by the addition of a small quantity of ipecacuanha or some active preparation of antimony.—When a regular tertian continues two or three months, and the paroxysms become slighter, but not longer; and run into one another; opium may be employed with great advantage, should the sleep be restless and unrefreshing.—This is sufficient at present with regard to procuring *Rest by Opium*, or its other effects. The author will have occasion to attend to it farther afterwards.

When the paroxysm is about to come on, the patient should be *laid in bed*, where no part of the system is disturbed by his situation. The heart neither has such a height to throw the blood, as in an erect position; nor have the powers of circulation such a column of blood to sustain and overcome in the ascending veins. The heart therefore and the powers of circulation are left to employ their whole force unincumbered, during the paroxysm of the disease.—When in an horizontal posture, the body is supported on a great number of parts: consequently the pressure is more equal on every part of the body; and the system is not exhausted by an exertion of muscular power to keep in balance the parts supported.—A more equal degree of warmth, moisture, and relaxation takes place in bed over the whole body; and gives a greater disposition to the crisis to take place early and be more perfect.—There are no ligatures then applied to any part, so as to prevent the blood from flowing freely.---The patient therefore should *go to bed about an hour before* the commencment of the paroxysm; continuing there during the *whole* of it. (This is not so necessary however towards the end of a regular tertian; when the paroxysms become slighter and are extended to a greater length.)

It is by *no means proper* that the patient should be in bed *during the intermissions;* excepting at the ordinary time of sleep.---The muscles lose their firmness by continuance in bed, during health, for a longer time than is necessary for sleep. The whole body becomes plumper, softer, and more disposed to be acted upon by every thing that has effects upon it; (such as emetics, purgatives, exposure to cold, stimulants, and the causes of disease.) The strength of the moving parts is very considerably diminished by lying in bed: the powers of digestion are diminished; and the appetite is not excited by the usual want of food. Less food is received into the stomach; and the same food is more apt to produce disturbance in the system. —By continuance in bed a man also becomes languid in his mind; and more unwilling to exert himself in exercise or labor of any sort.

During the intervals of the paroxysms, (excepting that the patient should be allowed to sleep, if he be disposed, just after the paroxysm is gone off; and during the natural time of sleep;) the patient should *dress in his ordinary clothing;*---and this even in cases where he is too weak to remain in an upright posture; (which however does not happen in the case the author is now treating.)

The exertions which take place during the paroxysm, leave the patient *somewhat weaker after* the crisis has taken place and the whole paroxysm been completely finished; than he would have been independent of it. The natural powers of the body soon get the better of this weakness, and restore the patient to his former vigor. But when a new paroxysm succeeds a former one, after a short interval; this will exhaust the powers of the body in a similar manner, and leave the patient still weaker.---Were the disease however to consist of two regular paroxysms only, both terminated by complete crises; the natural powers of the body would probably overcome this second weakness. But when *paroxysm returns after paroxysm,* (as is the case even in the most regular tertian,) and repeated weaknesses are left after each; he does not recover sufficiently in the intervals to encounter the next, with his powers perfect: and of course every subsequent paroxysm will leave him still weaker; (supposing that the disease were perfectly regular from the very beginning, and during the whole of its progress.)

When there is hardly any remission at the beginning of a tertian, and afterwards imperfect intermissions; there is not time during the interval, for the *Strength to be recruited,* in the same manner as when the intermissions are perfect or nearly so.---In this case, by the time the intermissions become regular and tolerably perfect, the patient is already much reduced in strength; and if care be not taken to keep up the powers of the body after the intermissions have become regular and perfect, the patient may not be able to support the shocks of the subsequent part of the disease. He may either sink in the cold fit; or when, towards the end, the paroxysms grow more irregular, weakness may take place in such a degree as to prove fatal; or the disease may be rendered irregular.---When the paroxysms therefore become *regular,* the practitioner should endeavor to *restore* the strength of the patient as much as possible to its natural state.

The first attention to this indication, is to employ proper food; to take care that the *primæ viæ* perform their functions well; that sleep be encouraged; and that the patient shall not indulge himself in bed, when it is not the time of natural rest, and when the paroxysms are completely over.

Practitioners have imagined that something more might be done to recruit the strength of the body, than *merely leaving it to these* *natural means;* and that *medicines* might produce this effect:—but their ideas on the subject are very much confused; which renders it necessary to *investigate the subject more particularly.*

The idea of strength which first presents itself in inanimate matter is *Cohesive Power.*—Steel requires a greater force to break it than marble; therefore is deemed stronger.—But although a given power will easily *bend* a bar of gold, which will not bend an equal bar of steel; yet if equal hanging bars of these metals be fixed at one end similarly in every respect, a *weight* at least four times as great will be required to break the gold, as will be necessary to break the steel.—In respect to stretching, the gold bar is the strongest; but if the idea of strength be taken from their bending, the steel.---*Both* these ideas of strength have been adopted by practitioners in medicine.---The strength consisting in inflexibility, may be admitted in parts of the human body, such as bones; although not rigorously. (A bone is said to be strong which does not break when a great power is applied to it: and weak, when broken by a slight one.)---That strength which prevents parts from being *torn asunder,* has often been considered as strength in medicine. As when the gastrocnemii muscles contract suddenly or with great force, the tendo Achillis sometimes gives way; and wants therefore sufficient cohesive power to communicate the force of these muscles to the foot. In this case the muscular power of these muscles cannot be said to be diminished; because their force of contraction is sufficient to overcome the strength of the tendon: it is the *tendon* only that is weak. In similar cases therefore it cannot be said that the body, generally, is weak.

When the whole of a contractile fibre of a *muscle* contracts at once, all the particles must come nearer each other in the direction in which the fibre contracts. It is impossible that particles can come nearer one another, and go to a greater distance, at the same time and in the same direction: therefore every muscular fibre in contracting, must possess a power of resisting its whole force in every part, so as not to break by its own power of contraction.---Supposing one half of a fibre of a muscle should contract, and the other half should remain at rest: that which remains at rest must be looked upon in the same light as a tendon; and if broken through would not evince any want of muscular power; (excepting perhaps so far as that the exertion not being in the whole muscle, the effect would be less).

The many *cavities* in the body of various forms destined to contain fluids or solids, may be divided into *two classes:* those opening externally, and those not opening externally: (the gall bladder for instance is of the first kind; of the second, the cavity of the ventricle of the heart). There is also a *third* kind of bag, which is not naturally destined to contain any thing; but merely so much fluid as to moisten the surface, so as to allow of motion; (such as the cavity of the pleura and peritoneum).---The *first* kind, (destined to receive and contain for a certain length of time matters thrown into them,) may sometimes be filled with such a quantity as to distend them to a degree that would burst them; had the body and the bags themselves lost their life: in which case the cohesive power might be considered as too weak. This hardly ever happens in the living human body.---The same may be said of those cavities of the *second* kind; which do not open externally.---Of the cavities which naturally contain only a sufficient quantity of fluids to *moisten* them; there are many instances of fluids thrown in so as to burst them. The skin of the leg for instance bursts, in oedematous swelling; but this has hardly ever been attributed to weakness.—It has been supposed that medicines capable of increasing the cohesive power of the fibres, or membranes of the body; were capable of giving greater *contractile power.* Alum, oak bark, and other *astringents,* increase the adhesive power of the skin of a *dead* animal considerably; and therefore have been supposed by many to act in this way as strengthening remedies; it not being considered, that if power of contraction depend upon cohesive power, it would be absurd to apply the *small doses of those medicines usually exhibited.* (What tanner would attempt to tan a hundred weight of leather with a drachm of oak bark ?)

Muscular strength does *not therefore depend on cohesive power.*

Elasticity is the property by which the particles of an inanimate solid come nearer to, or recede from one another.---If a steel rod be *bent,* the particles on the inside of the curvature will be brought nearer to one another; while the particles on the outside of the curvature will be carried to a greater distance: but without loss of continuity: (for as soon as the bending power is removed, the particles that were brought nearer, will force themselves to a greater distance; and those which were on the outside of the curvature, will approach each other; and not only so as to restore the bar to its original state, but likewise to give it a bend on the opposite side: and so it will continue to *vibrate* for some time.---If any long elastic substance (such as steel or catgut) be fixed perpendicularly at the upper end, and a *weight* be hung at the lower end; the rod will be drawn out to a greater length; but at the same time become smaller in diameter. Upon removing the weight, it will return to its original length and diameter; and *vibrations* will take place in it; (which may be considered as similar to those which arise, on removing the bending power from the bent rod).—If a force be applied to both the ends of a cylindrical rod of steel, so as to *press them towards one another;* the rod will be shortened and rendered of a larger diameter: and on removing the power, the rod will return to its former length and diameter; (similar *vibrations* taking place until it settles at its proper length.)—If a *steel ring be pressed forward upon a cone,* (the diameters of which increase slowly,) the diameter of the ring will become greater; but on withdrawing the cone, *vibrations* will take place in the ring; until it settles at its original diameter and thickness.—If a rod of a perfectly *un-elastic* substance be fixed at one end, and the other be drawn in the direction of its length; it will break, without having been lengthened in the least: But if an *elastic* rod be thus drawn out, it will allow itself to be lengthened to a certain degree; but will afterwards be broken.

If a *dead* muscular fibre be fixed at one end, and a weight be suspended at the other; it will be *drawn* out to a greater length: but the weight being removed, it will return to its original length.—In the same manner, if a dead muscular fibre be *pressed together* by a power applied at the ends; it will be rendered shorter and thicker: but on removing the power, it will return to its former length and size.---If a dead muscular fibre be bent into a *ring,* and any power be applied to distend it; its diameter will be increased: but when the power is removed, it will return to its former state.---So if a power be applied to lessen the diameter of a dead muscular ring; the ring will contract: but on removing the power, it will immediately increase to its former size; (and *vibrations* would take place, *were nothing to act but elasticity.*)

The moving fibres of the body are therefore endowed with an "Elastic Power;" by which (on being either extended or contracted beyond their natural state,) they will be restored, as soon as the power is removed by which they are distended or contracted.---Wheth-

or the muscular fibres in the living body are prolonged *beyond what their elasticity would allow*, or shortened more; is a question only to be decided by experiment.

If an animal be *suddenly killed* by a cause not affecting the elasticity; it will be found, on laying bare any muscle and dissecting it out, that the muscular fibre will extend, on replacing it, far beyond the length from its origin to its insertion; its elastic power (a power independent of life) remaining the same; the power of life only being destroyed.—From this it will appear, that it had been contracted by some other power, while the animal was alive; *more than it would have contracted by its elasticity*:—therefore that there is a power constantly contracting the muscular fibres of a living animal more than they would be contracted by their elasticity.—After the life is entirely gone out of an animal, which has been killed in the same *sudden manner*; the *blood-vessels*, (which are perfectly cylindrical and perfectly full,) are immediately enlarged; so as to be capable of holding a much larger quantity of blood. There is not blood enough in this case, nearly to fill the ventricles of the heart: there is indeed so little blood in the arteries in proportion to their cavities, that the ancients supposed they contained air only. The capillaries are not nearly full of blood; which appears from the paleness of the different parts of the body: (and they become florid, if an injection be thrown into them of no deeper hue than the blood.) The veins too, instead of being cylindrical, are flat; and not half full of blood.—It cannot be denied that the *elasticity remains the same in such a depth.* It is therefore constantly tending to enlarge the vessels, and prolong every moving fibre: but is overcome by a superior power, which exists in consequence of the *life* of the part.---It appears then, that the fibres of the body, and the parts capable of producing any action, are not governed by the adhesive power of their particles; nor by their elasticity; (as they are always contracted in one direction, more than they would be by their elasticity).---This other contractile power has generally been called "*Muscular Action.*"

Muscular action seems to be exerted when the animal is at perfect rest. A contraction takes place continually in the moving part, which is greater than the elasticity, though it is constantly counteracted by the elasticity.---When the *Tone* of a part is spoken of, this is to be understood.---There is an instance of this constant action, counteracted by the elasticity of the part itself, in *bivalve shell-fish:* for in the cockle, there is an elastic ligament on the outside of the shell, which endeavors to open it; while there are muscles which counteract the elasticity of this ligament, and shut the shells. When these are not forced into action by the animal's dread of an enemy, the elastic ligament opens the shell to a certain degree; but not nearly so much, as if the muscles were cut through, and the ligament left entirely to its own elasticity. The muscles therefore, when the animal is at rest, are still contracted; so as in a certain degree to overcome the elasticity of the ligament:---And this contraction is the "*Tone of the Muscles.*"

It is the same where the *elasticity* of the muscular fibres themselves *counteract the tone.*---The urinary bladder for instance, in a human body recently and *suddenly killed by means which destroy the life in all the parts,* (such as a blow on the stomach;) and which would allow a quart of urine to be contained in it, without overcoming its cohesive power or bursting it, or without resistance by its elasticity: yet while the animal is *alive* sometimes will not allow itself to be distended so as to contain a pint, without being stimulated to evacuation; (sometimes not half a pint.)—It will at the same time allow itself to be *distended* to a less degree, without any stimulus at all.—This *resistance* in the urinary bladder to be distended above a certain degree in a living animal, cannot be from the cohesion of its particles; (for it may be distended twice, thrice as much, or more, without bursting): nor can it be from its elasticity, (for the elasticity remains the same after its death; when it will allow itself to be distended to a considerably greater degree without any resistance): nor can it be from its muscular exertion, (for when the muscles contract they evacuate its contents.)---It might be suggested indeed that it was *not the muscular fibres of the bladder itself* that evacuated its contents; but the pressure of the muscles of the abdomen upon the bladder: but every man from his feelings will perceive, that although the pressure of the muscular fibres of the abdomen do indeed assist in evacuating the bladder when much distended; yet very often the evacuation is evidently made without any exertion of the abdominal muscles.---This is further proved by cases where the muscular fibres of the bladder, become paralytic; in which case the urine is not evacuated, although the muscles of the abdomen have their full power.---It is evident therefore that the extent to which the urinary bladder will allow itself to be distended, does not depend on the cohesive powers of its fibres, nor upon their elasticity, nor upon their muscular exertions when stimulated to contract; but on a disposition in the muscular fibres to allow themselves to be distended to a certain degree, (and no farther,) without being stimulated to a contraction.---This disposition (we repeat) is their *Tone.*

In the *stomach a different contraction takes place,* which will allow it only to be distended to a certain degree. When *empty* it will readily admit a certain quantity of food; but if a *greater quantity be attempted to be thrown in, it will resist* the reception of the surplus: (and pain, uneasiness, and nausea will be produced;) although the stomach is not distended nearly so much as its cohesive power or elasticity would allow.—This *other* contractile power which shortens the moving fibres much beyond their tone, is called the "*Action of a part:*"—as when the stomach contracts upon the food in digestion and forces it through the pylorus; or when any muscle moving an extremity contracts, so as to produce that motion.—This contraction does not remain constantly the same for any length of time: for first it is evidently *alternate;* (as in the action of the auricle of the heart, which no sooner contracts but it relaxes again; and so of the muscles of respiration: and again in the peristaltic motion of the intestines, where the alternation is very evident.)—In the muscles extending, or otherwise *moving an extremity, the alternate action is not so apparent.* But it may be rendered visible there by magnifying it: as by placing for example a long flexible rod in the hand of a strong man: for if he extends his arm, the motion of the end of the rod will evidently shew, that the muscles of the arm are making alternate contractions and relaxations.---There are therefore two "*Muscular Powers:*" *one* keeps the muscular fibres, when at rest, contracted to a certain degree beyond their elasticity; the *other* produces a still greater contraction, which is only temporary.

The tone of a part is *not* always the same.---The stomach of the same person for instance, will at times allow itself to be greatly distended without making resistance: at others it will resist, if a small quantity of food or drink be thrown into it.

It does not follow, because a part is strong: that the tone is such as to allow of only a small distension.---There is a certain degree of tone which is natural and proper for a moving fibre. When the stomach is weak, it will frequently only admit a small quantity of food, without being stimulated by the distension: but when strong, it will admit frequently a great quantity of food without making much resistance.

Where a moving part consists of many moving fibres; and in one of these fibres there is a *proper* tone, another fibre is *contracted* beyond its ordinary tone, and another at the same time is *distended* by its elasticity beyond it; that part can never be said to be strong: because if brought into action, that fibre only will produce the proper effect, which is of the ordinary length according to its natural tone.*

The frequent attacks of a regular tertian are apt to weaken the tone in *both* ways.

After a tertian has continued some weeks, the stomach and intestines (instead of possessing an uniform tone) are contracted in some places; in others, relaxed to a greater degree: so that spasmodic contraction takes place in some parts, relaxation in others.---The muscles in the extremities also become flabby.---The action of all the parts therefore becomes *less powerful and less regular* than in health.---To remedy this, a " Class of Medicines" has been employed during the progress of the disease, with a view to *restore and keep up the tone.* These medicines (as contained in the Materia Medica of the London College) are, abrotanum, absinthium maritimum, absinthium vulgare, carduus benedictus, centaureum minus, chamæmelum, cinchona, columba, cortex aurantii, cortex limonum, gentiana, quassia, santonicum, tanacetum.---All these contain a bitter juice, Whether that bitter juice be the same in all (as the sugar and astringent matter of all vegetables are the same) has not been determined by chemical experiment.---They contain various other matters which have medicinal powers.---The absinthium contains an essential oil (totally different from its bitter juice): the cortex aurantii not only an essential oil, but also an astringent juice, (perfectly distinct from the bitter one.)---This kind of bitter juice itself seems to have the same effect in preserving or restoring the tone, from whatever plant it is taken.---Various preparations of *Iron* have also a similar property.---But how these substances should contract fibres too much relaxed in their tone, or relax fibres too much contracted; is not at all known.

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* The author distinguishes, in solid bodies, between *cohesion*, which is a mere adhesion of particles; *brittleness*, where the particles wholly separate or break off under the application of mechanical force, to avoid an essential change in their relative positions; *ductility*, where these particles change to a certain degree their relative positions, without changing their general texture; and *elasticity*, where they seek to regain their first positions, after certain derangements made by pressure or distention. In the human body, *tone* is a connexion between the particles of certain soft parts, which is more powerful than either the cohesion or elasticity belonging to the same particles; while *action of parts* (analagous in some respects to voluntary motion) is still more powerful than tone.

There are some remedies, the mode of action of which can be easily ascertained.---When a quantity of superfluous acid is formed in the stomach, every chemist must know that *chalk or alkali* thrown down will unite with the acid; and destroy its acidity.---Any man acquainted with the natural history of the *insect* or reptile which produces the itch, would be able *a priori* to apply a remedy. He would know, that it was apt to creep from the body it already occupies, to the body of another man which came into contact with it: that it would bite and stimulate a part where the mucus was soft, (as between the fingers for instance,) and occasion scratching; and excite a sufficient degree of inflammation to produce a pimple: that it would lay its eggs and propagate in this pimple; from which the animal itself has frequently been taken out and shewn in a microscope. So far skilled in this distemper, he would naturally apply a poison; perhaps sulphur with grease, if he had no idea of cleanliness: but if he had a greater regard to cleanliness, he might wash the parts affected with a solution of corrosive sublimate in water; and he would continue the application until the animal itself was killed, and all its eggs hatched, and all its young destroyed; (which happens in about a month;) and so cure the disease.---In these instances the mode of action of the medicine is known.---But when a medicine is to act upon the *living powers of the body*, it is impossible to account for its actions from mechanical or chemical principles; (because the living powers are not governed by mechanical or chemical laws; and all the knowledge respecting them must be learnt by experiment only.) ---So the chemical effects of a chemical operation are known; but *how* these effects are produced is not known. (We know that sulphur and pure air form vitriolic acid; but why, no man can tell.)

A bitter medicine does not act in restoring tone, by increasing the adhesive power of the moving parts; for the tone does not depend upon the adhesive power. Neither does it act upon the elasticity, for by this the tone is counteracted.---Where its tone is diminished, so that a moving part is contracted too much or too little, in consequence of a disease; after the entire cessation of the disease, (as after a hæmorrhage, arising from an accidental cut into a blood-vessel,) the tone will be much sooner restored if bitter remedies are exhibited than it would be naturally. That is, if spasmodic contractions should take place, they will sooner go off; if the muscles become flabby, they will sooner become firm; if water be deposited so as to form œdematous swellings, the tone will be restored to the exhalants and absorbents, (and water will be no longer deposited). ---These instances are sufficient for demonstrating that these medicines have a *power of restoring the tone.*

The action of many medicines producing effect upon the living powers is entirely *upon the stomach.* This proposition will be considered more fully afterwards.---These bitter medicines and preparations of iron (for instance) do not appear to be carried into the blood-vessels, and thence applied in different parts of the body; but to act in the stomach alone.

These medicines appear to be more efficacious when *mixed together,* than when exhibited singly; and this opinion is supported by the prescriptions of almost every practitioner who has conducted the cases of many patients---To state why this is the case, would lead the author at present into too great a digression.

It is *not* necessary to give these bitter medicines *in substance.* An infusion or tincture of them may be employed with equal advantage; and they are less disagreeable to the patient in this form.--- *Nor* is it necessary to give them from the *beginning* of the disease: they would indeed be hurtful before perfect intermissions are produced. Perhaps, it is not necessary to exhibit them until appearances of want of tone begin to take place.

They should be given *during the intermission;* (in doses equivalent to a drachm of the bark of cinchona, exhibited every six or eight hours.)

Whether these remedies give a stronger *power of action,* as well as restore the proper tone; is uncertain.---In one light, a due tone must always produce a stronger action. If there be three fibres for instance in a moving part, and one of these be contracted too much, one properly, the third too little; if the tone be restored, so that all three are by their tone properly contracted when brought into action; the whole force of the three will act together: (which would not be the case while the contraction from the tone was different.)

[illegible] Exercise, both increases the tone and pow-

[illegible] that the power of action of a muscle is
[illegible] frequently into action. The bulk
[illegible] are also increased by it.---Where ex-
[illegible] the power of action, (in other words
[illegible] must be universal; for only that
[illegible] brought into action has its power in-
[illegible] the powers of his arms only, while he
[illegible] of his arm is consequently increas-
[illegible] lower extremities is even diminish-
[illegible] strong, that he is subject to
[illegible] system, excepting his arms.)
[illegible] power in any animal
[illegible] excepting parts the actions of
[illegible] : such as the action of
[illegible] respiration, &c.)—It is neces-
[illegible] body and mind should rest
[illegible] organs of sensation perhaps
[illegible] to the mind; that the oper-
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[illegible] This is *directly* proved
[illegible] adequate quantity
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means the blood is prevented from passing through the lungs, if a sufficient quantity of pure air is not applied to it. It is certain, however, that if the due proportion of air is not inspired, a quantity of blood is brought to the lungs, which does not readily pass through them; but is accumulated in all the vessels about the right side of the heart. Anxiety and oppression about the præcordia take place: —and derangement and loss of strength arise in the whole system. It is therefore necessary, that a proper quantity of pure air should be applied to the lungs, to allow the blood thrown upon them to pass through them; otherwise the above appearances, followed by debility, will take place.

It is proved, that exercise occasions a larger quantity of blood to be brought to the Breast, by the veins being universally rendered much fuller: (a much larger quantity of blood flowing out in a given time, if one of them be opened.) If blood flows in the veins, when fuller, with increased velocity; more must be carried to the lungs.

In one respect, the air of the atmosphere is to be considered pure, in proportion as it contains the vapor necessary for the respiration of animals.---This vapor (which has been called pure air) generally forms about one fourth part of the atmosphere; but (as it has been but lately discovered what proportion it generally bears) it will require some time to investigate how far a greater or less proportion may be beneficial or prejudicial. It has been found that the constant and various currents in the atmosphere keep it nearly the same, as to the proportion of its contents.---If a man be shut up in a close place, where there is not this proportion of pure air; difficulty of respiration will take place; and labor or much exercise in such circumstances will weaken, instead of strengthening him.

The atmosphere may contain vapors, or, (being very viscid,) powders may float in it, that may be hurtful to the lungs, or prevent blood from passing through them so readily: (gas or fixed air for example, which is always found in the atmosphere; vapor of nitrous or muriatic acid; putrid vapor; and the air of large towns, having powdered horse dung, soot, gravel, ashes, suspended in it.) Respiration will always be difficult, when these substances are inspired; and therefore prevent the good effects of exercise.

The difference between labor and exercise lies in the attention of the mind.---That kind of exertion of the muscular power is exercise, which is employed with the accord and delight of the mind:

and then it tends to give strength to the system. On the contrary, that which is employed against the consent of the mind; instead of giving vigor, diminishes the strength.---But it is extremely difficult in many cases to discriminate what exertions of the body are with or without the accord of the mind; for mankind would naturally be always at rest, if not stimulated into action by some passion of the mind, or some real want. (A North American Indian remains at rest, sitting, and looking straight forward; until forced into action to procure himself necessary subsistence, or until excited by passion or pain.)---In some measure, all exertion whatever is against the will of the mind; but that in which the passions are excited and which is not produced by absolute necessity, is particularly the kind which gives strength. Whatever exercise therefore is employed, merely for the purpose of restoring strength; is less efficacious, than where an inclination for it is excited. If a man rides out for his health, the anxiety he feels, prevents the exercise from being useful; but if he is going where he will be amused (as in following a pack of hounds), he will be strengthened.

Exercising a diseased part, tends always to derange it still more; excepting when the disease is want of tone only.---Any attempt to exercise an inflamed muscle would increase the inflammation, without giving strength. A muscle affected with rheumatism would be weakened, instead of strengthened by exercise, while the rheumatism remained;---and so generally.

In the beginning of a regular tertian, when the intermissions are imperfect, exercise ought to be avoided.

When considerable relaxations take place, (the pulse returning for many hours to its natural state, and the uneasiness and restlessness going off); the patient should have his ordinary clothes put on during such relaxation.---Although he is only able to lie upon the bed, somewhat more of exercise will be used, than if confined to it.

Friction by rubbing with a flesh brush or a cloth, is a species of exercise which does not appear to be exertion to the patient. It was much more frequently employed by the Greeks and Romans, than it is at present;—probably because their warmth of climate allowed of it without danger of the patient's catching cold. Where proper means are taken to obviate this difficulty, friction may be advantageously used in many instances. It does not exhaust the strength, and is extremely agreeable to the patient.

When the intermissions at the beginning of the tertian are very imperfect, hardly any other exercise than friction should be used. When they are somewhat more perfect, but not so as to admit of great exercise; the patient for the first week or fortnight, (after more perfect intermissions have taken place,) should only go out of his bed-chamber into the other room where the air is purer. If he lives in the country and the weather be fine, he may walk in a garden, or even among fields, for a little way; but always so, that too great attention of the mind to the state of his health be not excited.

After the disease has continued a fortnight, if the intermissions have become nearly, although not quite perfect; a greater degree of exercise may be useful; such as being carried in a chair or litter, (which although disused at present, would often be advantageous, if the patient were in a situation to employ it.) The motion of a coach may succeed this, as an exercise somewhat more violent; or the patient may be carried in a boat.---Where the latter mode is used, it must only be upon a river or canal; where neither marshes nor ditches are upon its banks. If on a canal, it must be of considerable length, so that the water does not stagnate; (the vapor arising from stagnating water often occasioning the paroxysms to be prolonged, and the intermissions to be disturbed.) It must be remembered, that a moist atmosphere is the only cause that has an effect on the disease, after it has once been produced: therefore, a boat can only be used successfully in a serene and clear atmosphere.

When the intermissions have become absolutely perfect, more violent exercise is useful; such as riding on horseback.

In these exercises all the muscles of the body are exerted.

Many other kinds of exercise which have been frequently recommended, are injurious; as they militate against the rules to be observed.---Such are all great exertions of the muscles performed in the bed-chamber of the patient, or in any apartment where the air is confined; (as striking heavy pieces of lead together, or forcing the body up and down on a chair supported by springs): for in these the air is contaminated by the respiration of the patient and any other animal in the room, and the patient's mind is occupied with anxiety on thinking of the necessity of thus exercising himself.---The utility of exercise in a carriage of any kind will be diminished, unless the patient's mind be at the same time amused with the variety of prospects or objects presented to it, by the change from confinement, &c.: therefore a chair or litter (although so easy in themselves) are often less proper than a carriage, where there is conversation which may contribute to the amusement of the patient.

Where riding is employed, the patient sometimes becomes weaker, instead of stronger; unless he takes pleasure in the country he passes through, or has some object in view at the end of his journey.

All kinds of exercise for the purpose of business, and considered by the patient as labor, are hurtful;—but with this exception, that greater anxiety may arise in his mind when he entertains suspicion that others are negligent of his concerns. Thus a ride of ten or fifteen miles (so that the patient does not over fatigue himself) will often contribute greatly to the restoration of strength; if it be to see whether something in which the patient interests himself be properly performed; especially if it turns out according to his wish. These exercises may be continued while the intermissions remain perfect.

When a tertian which has been regular for a time with perfect intermissions, becomes again irregular, the paroxysms slighter although longer, and the intermissions less perfect; the same tonic medicines and the same exercise may be continued. Long experience has proved that when a disease is disposed to go off, it diminishes and goes off with as great obstinacy as it increases at the beginning.

Many practitioners have conceived that when a tertian arises in a temperate or cold country, the fever itself is the natural cure of some *other Evil* in the constitution: and therefore that a regular tertian (especially) should be left to go through its natural course.---Others more sanguine, (perhaps more wise,) think the sufferings of a patient during the course of the most regular tertian, ought to make them employ every possible means to prevent the disease from going through its natural course; and to relieve the patient immediately.—There could not be a moment's hesitation in determining to restore the patient to perfect health at once; were there any remedy or mode of treatment that would certainly prevent the returns of the paroxysms of a tertian intermittent; and take off the symptoms remaining after the crisis, so that no other disease should follow.---But there most undoubtedly is no medicine uniformly efficacious; or that always leaves the patient in tolerable health, and secure of not being destroyed by the remains of the disease or by some other disorder arising in consequence of it.

Were there any such, why should different practitioners attach themselves to particular varieties of bark; (recommending the brown, the yellow, or the red, with such decided preference?) Why should they prefer arsenic or zinc; if any one were uniformly successful? It would not be an object for physicians of experience, (who have practised in every case of the disease,) to recommend one or the other variety; nor any other remedy employed for the cure of regular tertians. In many cases of perfectly regular tertians, the most skilful practitioners have been baffled in the use of Peruvian bark, and of every other medicine recommended as useful in the disease.---Hence the necessity of laying down a mode of treatment to be pursued, supposing the disease to go through its natural course; ---as the author has done.

There can be no doubt but that the paroxysms of regular tertians are repetitions of the paroxysm of simple fever.---The symptoms are in all respects exactly the same; (excepting that in a simple fever all the appearances of the disease are carried off by the crisis: while at the beginning of a tertian, the symptoms are never entirely carried off by the first crisis; excepting when the patient had been before afflicted with the disease.)---In the middle of the disease, when perfectly regular there is no difference whatever between them; (excepting there being only one paroxysm in a simple fever; and in a tertian, a number of them).---Towards the end of a tertian, the paroxysms are less severe, with more imperfect intermissions.

The only apparent reason for the return of the paroxysms in a tertian, seems to be that the first crisis is imperfect.---It appears probable, that remaining symptoms of the first stage (after a time) may increase suddenly, and produce a new paroxysm;---but why rather at the end of forty eight hours, than at any other period, cannot be accounted for.

Since also, when the patient has been before afflicted with a tertian, (even after the interval of a twelvemonth,) and a fresh attack of fever takes place which terminates in a regular crisis; the paroxysms nevertheless return: it would seem that the *Habit* acquired by the former tertian occasioned simple fever to take this form. Hence it may be presumed, that when the intermissions become perfect the disease is continued by habit.

Upon these grounds, attempts may be made to carry off the disease; *without suffering it to go through its regular course.*—Although no alteration has been discovered in the solids or fluids during any part of the disease; yet it may be possible that some contraction or motion of the body may have taken place, for the removal of which, the exertions that arise in fever may be necessary.—It becomes therefore matter of experiment to determine, *whether a fever may be stopped in its course* without prejudice to the general system.—If regard were had to the medicines only which were employed by the Greeks and Romans, and the *earlier* modern practitioners; it must be determined that it was seldom proper to try to stop the natural progress.---But by the remedies of *modern* times, it is evident that tertians and other fevers may be put an end to with safety to the patient. We know however, that there is not any remedy which will *certainly* carry off the disease; but that a regular tertian will sometimes go through its natural course in spite of every attempt to terminate it.

It is also a question to be determined, whether by stopping a tertian in its course, *some other disease may be produced;* which will either be more distressing in itself, or which may terminate in the death of the patient?—The author is of opinion that a tertian should not be checked in its progress, *if it be* at the hazard of the life of the patient;—but where the risk is of *some other disease not fatal*, a stop may be put to it in its course; (for few others are more painful.)

In considering the medicines to be employed, when the tertian is not permitted to go through its natural course; the author thinks it most eligible to treat of those *first*, which appear to be pointed out by what happens in the *disease* itself; and afterwards of those, which have been *found out by accident* to cure it.

Any medicine that would produce *the same circumstances* which happen when a perfect crisis takes place naturally, (by rendering the crisis complete;) may occasion the fever to be entirely carried off, and not to recur.

The *first* class of remedies tending to produce the same effects as occur in natural crises, are *Emetics;* all of which occasion similar appearances in a greater or less degree.

Ipecacuanha, or tartarised antimony, producing these effects in the greatest degree; are therefore taken as examples.

These when first thrown into the stomach, produce no sensible effect, as they are not in the least nauseous to the taste; but by degrees the patient becomes chilly, begins to look pale, and an uneasiness is felt about the stomach. The sense of uneasiness is changed into a feel of sickness; the exterior parts of the body become colder and paler, (the latter evidently showing that the small vessels are contracted): and the skin being pale; shows the dirty brown color of the rete mucosum and sebaceous matter of the glands of the skin. The powers of the body and mind are depressed; the sickness increases; vomiting is produced;---which has been imagined by some authors, not only to evacuate the contents of the stomach; but also, by producing great agitation of the body, *to force obstructing matters through the small vessels.*---But whoever has experienced the agitation produced by an emetic, as also that which occurs on riding in a coach without springs on a rough pavement; must be sensible, that the latter is infinitely the most violent; yet without producing any freedom from obstruction.

If substances are contained in the stomach, these are thrown up without much uneasiness; and the stomach becomes quiet.---After a time, a glow of heat takes place in the extremities and exterior parts of the body; the skin recovers its color, softness, and plumpness; sweating comes on; the sickness and uneasy sensation about the stomach cease; and the muscular powers of the body recover their force to a certain degree. The patient remains quiet for some time.---Soon after however the same symptoms recur, and vomiting is reproduced. If any thing more be contained in the stomach, it is thrown up; frequently bile along with it, and other fluids secreted by the glands whose excretory ducts open into the duodenum. After the second fit of vomiting is over, the same enlargement of the small vessels and other subsequent appearances take place.---The fits of vomiting, with all the concurring circumstances, may return three or four times.---When they cease entirely, the patient often falls into a profuse sweat; the secretions from the kidnies and intestines are increased; there is a greater flow of saliva in the mouth; and all the appearances take place which arise in the crises of fever.

An emetic therefore given during the paroxysm of a tertian, and acting along with the tertian itself; may produce a more perfect [illegible] complete, and the fever [illegible] in many cases.

[illegible] administered during [illegible] evacuation after [illegible] proves stimulating [illegible] being often sufficient [illegible] the general disposition to [illegible] drunk; to [illegible] of washing [illegible].

[illegible] powerful than [illegible] the appearances that take [illegible] fluids gives a [illegible] critical symptoms [illegible] long [illegible] the disposition to critical symptoms [illegible] of producing a [illegible].

[illegible] the beginning of fever, [illegible] to be preferred, [illegible] of the crisis of fever. [illegible] than tartarised antimony [illegible] passing downwards [illegible] more efficacious in producing [illegible] over.—The better [illegible] of these remedies [illegible] preparation of antimony [illegible] in use of [illegible] was employed by [illegible] so [illegible]. This remedy is not [illegible] and Spain.

[illegible] loses its peculiar [illegible] be exhibited [illegible] the effect of producing [illegible] after the vomiting is over.—It is true, that [illegible] up in the first [illegible] has made an impression on the stomach [illegible] good when the remedy is thrown out of it. [illegible] are less efficacious.—A grain of tartarized antimony, with from five to ten grains of ipecacuanha, is quite a *sufficient dose.*

In order to produce the full effects of an emetic in procuring the symptoms of crisis, it should be *given to the patient in bed;* (that is, when the disposition to general increase of secretion and circulation in the exterior parts, may be aided by the equal warmth of the bed).

Although symptoms of crisis are produced most strongly by tartarised antimony and ipecacuanha; yet *all emetics* have this effect in some degree.---Even if the *feathered end of a quill* be put into the throat, so as to irritate it gently; an attempt will be produced in the muscles of the abdomen, to contract and press upon the stomach, so as to throw up its contents; and some degree of nausea will be brought on; *but* there will not be any contraction of the exterior parts, nor alteration of the color of the skin, excepting in a very slight degree and very momentary: and although after the vomiting is over, there will be some glow of heat in the exterior parts and some disposition to sweat, yet these will continue for a very short time; and secretions from the other secretory vessels will not take place.

An emetic may be employed either in the *beginning, middle, or towards the end, of the paroxysm* of fever.---It may be exhibited immediately *after* the paroxysm is over, in the middle of the intermission, or a little before the paroxysm takes place.---Different effects will arise from the various periods of its exhibition, but these will be better explained in taking notice of the *other* remedies to be employed.

Preparations of antimony, ipecacuanha, &c. administered so as *not to produce vomiting;* bring on appearances similar to those of the crisis of fever.---Many have imagined this to be the effect of sickness, although vomiting did not ensue. This can only be determined by *experiment.*---The author has frequently exhibited tartarised antimony to persons in perfect health; in such a manner, that they were ignorant of having taken any medicine, neither did they feel the smallest degree of sickness: yet in about an hour afterwards the skin became softer and moister, than it would have done under similar circumstances, if tartarised antimony had not been given. Sometimes the person has been thrown into a profuse sweat, the mouth became moister, there has been a greater secretion by the kidnies and from the intestinal canal, and greater ease has been felt over the whole body. It cannot be said that these appearances took place from sickness, when the persons had not felt the least disagreeable sensation in their stomach, or any other part of the system.—Where these medicines have been administered to patients afflicted with fever; and a crisis by their means has been produced which would not otherwise have happened; the patients have frequently been entirely free from any feel of sickness and every kind of uneasiness about the stomach: yet the symptoms of crisis have begun in less than an hour after their exhibition.—When the stomach in fever will *bear but a very small dose of these medicines without producing sickness* (as a fifth or sixth part of a grain of tartarised antimony, for instance); the author has *rarely found that any critical symptom has been produced.* On the contrary; when the stomach was able to bear as *large* a dose as half a grain of tartarised antimony, without nausea following; the symptoms of crisis have been produced in a short time*.—From these observations it appears then, that it is not in consequence of the sickness that these critical appearances are brought on; but that the medicine has another power of inducing such appearances, totally independent of nausea.

It is entirely unknown how they produce this effect. It would appear however to proceed from some *impression they make on the stomach;* for their action is too quick to allow of their being carried into the blood-vessels; (commencing in many instances in half an hour or less, after the time of their exhibition).—When any medicine gets into the stomach, and afterwards into the blood-vessels, so as to be applied to any set of glands and to produce evacuation from them; it is always after a much longer interval than five or six hours. Mercury, which gets into the blood-vessels and stimulates the glands of the mouth; never produces an increased secretion of saliva in less than twelve hours. Even purgatives, which perhaps pass directly from the stomach into the intestines, hardly operate in less than two hours.—Therefore medicines that commence their operations on the glands in the body in less than an hour, must be considered as making their impression on the stomach; and so producing their effect.—Another circumstance pointing out that these medicines do not act by being absorbed, carried into the blood-vessels, and applied to the glands, is; that *tartarised antimony* dissolved in water and *applied to the skin itself*, is so far from producing softness in it and greater secretion from it, that it produces contraction and *dryness of the skin;* and has all the other effects of an *astringent* topically applied.—Many other arguments might also be brought to show that these medicines have their effect upon the stomach.

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* Some then would add opium, to lessen nausea and increase perspiration.

These medicines then, by the impression they make on the stomach, produce a *greater secretion from all the glands* of the body and all the secretory vessels; a softness and pliability of all the parts; an universal sensation of ease and tranquillity; in short, *all the appearances that take place in the crisis of fever.*—They often render the crisis perfectly complete, when exhibited in the paroxysm of a regular tertian; and therefore not uncommonly terminate the disease in what would have been the first paroxysm of a tertian, if these medicines had not been exhibited: And so in any subsequent paroxysm.

In order to produce these effects the medicine should be given in as large a dose, as the stomach will bear *without producing sickness.* ---That is, two sevenths of a grain of tartarised antimony, or a grain and a half of ipecacuanha, (and other such remedies in the same proportion); should be exhibited at the beginning of the paroxysm; and repeated in about three hours afterwards; the patient being kept in bed.—If profuse sweating should take place, he should be kept in bed until it is entirely carried off.

Where *a perfect crisis is not produced,* the continuing of these medicines *during the intermission,* produces beneficial effects; by taking off what remains of the paroxysm during the intermission. And also by diminishing the force of the next paroxysm, they tend to lessen the power of habit in producing subsequent ones.—They should be exhibited *so as not to occasion sickness:* and may be repeated every four, five, or six hours.—When exhibited every six hours during *the whole periods,* they also often carry off the disease; the paroxysms, after six or eight days, not returning.—This practice is also advantageous, as by procuring more perfect intermissions, *food of greater nourishment may be allowed;* medicines increasing the *tone* of the parts may be employed more freely; and *more exercise may be used;* so that these remedies may act with greater advantage.

Of the class of Bitters, the powers of *one* are so pre-eminent, as perhaps to have brought the others into a conspicuous point of view. —The bark of a tree which grows in the kingdom of Peru, is a powerful remedy in preventing the returns of a fever generally. It has been called *Cinchona,* from the name of a lady who has been supposed to have been the first who exhibited it; and this name has been adopted by the London College of Physicians.---The jealousy of the Spanish government with regard to their American possessions and trade, has prevented the specific characters of this plant from being perfectly known; much less to allow seeds or plants of it to be brought to Europe.---The bark of this, as of other trees, consists of an *internal* part; having vessels which appear like fibres; (but which carry juices for the nourishment of the plant.) The *exterior* part consists principally of cells; containing the peculiar medicated juice: and is therefore the part to be employed in medicine; and is now indeed principally imported.---It has sometimes been thought that the bark from the *small branches,* was more efficacious than that from the large. Sir John Pringle obtained a quantity from the annual shoots; part of which the author exhibited with very little effect.---It would seem that more of the interior fibrous bark was formerly imported with the exterior cellular part, (it being then taken from the large, rather than from the small branches of the tree;) for now no difference is found between bark from larger or smaller branches, provided they have been of *two years growth.*

Three kinds have been imported lately: one of a rich *brown* color; one *red;* and one somewhat *more yellow* than the ordinary brown:---Some practitioners have preferred one; some, another.---The author has exhibited them alternately with equal effect; excepting that a smaller dose has been necessary, when they have been very *perfect of their kinds.*---All these, (if perfect of their kinds) appear full of glittering particles, if broken and held in the sunshine; which appearance is lost, if the bark be *decayed;* and is destroyed, when a *decoction is made from it,* (which has sometimes been done without powdering it.)

The cinchona has been exhibited reduced to a fine *powder;* or infused in water, or boiled in *water,* (the insoluble parts being separated and thrown away); or digested in *alcohol, or in mixtures of* *alcohol and water*, (the insoluble parts being rejected.)---The water of the decoctions and infusions has been *evaporated*, so as to leave the dissolved part of the cinchona dry, which has been called an *extract;* and the alcohol and water of tinctures have been evaporated, leaving what has been called a *resin;* or the remainder, (after evaporating both tincture and decoction) has been taken and called *extract with the resin.*

It is certain that the *powder* is much more efficacious in preventing the returns of the paroxysms of tertians, than any other preparation of this bark; (whether it be that there are some menstrua in the stomach, which dissolve it more perfectly than water, or alcohol; or that it acts on the stomach in a solid form.)---This bark should be reduced to as *fine a powder as possible;* both because the fine powder is more efficacious, and because it may be exhibited without producing nausea.---In some *other* diseases (where the cinchona may be employed with advantage) the infusions, tinctures, and extracts, produce as much effect as the powder; but in all *intermitting* fevers the powder acts with very superior efficacy.---The powder has been objected to on account of its disagreeing with the stomach: and other forms have been recurred to as more agreeable to it, and to the taste.-- The taste of bark is less disagreeable than that of many other medicines; and provided it be reduced to a powder sufficiently fine, (so as not to be felt gritty between the tongue and the palate;) less objection is generally made to it in this state, than in any other form. (The greatest difficulty has arisen from practitioners themselves, who have suggested that it was unpleasant, and that they could find some more agreeable form: but where the necessity is urged, even patients who are prejudiced against it, make no objection to taking the powder.)

By what operation, or *in what manner* the bark of cinchona prevents the return of intermitting fevers; is an interesting subject of inquiry.---To determine this question, the author has exhibited it to a man in health, to the quantity of an ounce in twenty four hours; (which is sufficient in many instances to prevent the return of a regular tertian;) without any apparent difference taking place in the system. The blood on trial has consisted of the same parts and possessed the same properties as it did before the cinchona was exhibited; and the secretions that could be examined have remained the same, and in the same quantity: and the person has perceived no difference in any part of the system, but has had the same appetite, and the same sensations and powers of action. This medicine therefore produces no apparent effect on a man in health.---A much larger quantity of cinchona has been frequently employed in topical diseases, (such as gonorrhœa); where the general system has not been affected. The quantity even of two ounces in twenty four hours, for a fortnight together, has been exhibited; without producing any difference in the chemical or mechanical properties of the matter of the body; or without producing any apparent effect, excepting relief in the topical disease.---Therefore nothing tending to elucidate the effect of the cinchona, in preventing the returns of the paroxysm of fever, is to be found in administering it to persons in health or affected with topical diseases.

Since the powers of cinchona have been discovered, other substances have been employed for the same purpose; such as the medicines already enumerated, which have a similar *bitter taste* and are employed for restoring the tone:---also preparations of *iron*, which have been supposed to have similar powers;---likewise *zinc, arsenic, &c.*

Bitter medicines produce no effect when administered to a man in perfect health, and where the tone is already sufficient; unless they have a mixture of some other medicated matter; (such as camomile, which contains a stimulating essential oil; and orange peel, which contains an astringent matter:---Nor is any effect produced from the camomile, if the essential oil be distilled away from it.)

The return of the paroxysms of fevers have been sometimes prevented by these bitter medicines; although with *much less certainty*, (or in other words, much less frequently) than by the cinchona. ---The author has actually prevented the return of the paroxysm of a tertian, by exhibiting camomile, wormwood, and gentian, to the quantity of two ounces during the intermission; but they have much more frequently failed in their effect; (that is perhaps forty nine times out of fifty;) besides that their essential oils have considerably disordered the system.---Preparations of iron, &c. appear to be somewhat more efficacious.---Preparations of zinc have in some degree the same power; and if exhibited in a quantity sufficient to prevent the return of the paroxysm, they have no effect in health: but their effects are not so well ascertained as those of bitters and of iron.---Preparations of arsenic and of copper have also the power of preventing the return of the paroxysm of fever; but given in the same dose to a man in health, produce great affection of the system; (viz. violent pains in the extremities, and sometimes such affection of the stomach as to be fatal.)

The principal reason for noticing these medicines is to show, that the cinchona is not the only substance which has the effect of preventing the return of the paro[illegible]; and that it has an action common to many other substances.—What that action is, cannot be determined. It is only known, that it is more powerful in the cinchona, than in any of the other substances acting in the same way.--- But copper, zinc, and iron, are more efficacious than the bark, in preventing the return of the *paroxysm of epilepsy.*

The next thing to be considered is, whether the cinchona has any power of taking off the *paroxysm of an intermittent, which has already begun.*

When the cinchona was first employed, it was exhibited *just before the coming on of the paroxysm*;—and in some cases during the time of the first stage or *cold* fit.---A kind of tradition has been handed down, that exhibited in this way, it had proved fatal in certain cases: (and perhaps, if it be true, it was when exhibited during the time of the *first* stage.) This has deterred the author from ever employing it during that time; (as he does not think a physician justifiable in trying any experiment that has been conceived to be fatal, unless when it has been contradicted by other observations.)--- But he has in many instances employed it from the *beginning of the hot fit* (or second stage) of the paroxysm of an intermittent. In this case, *sometimes* no effect whatever has been produced during that paroxysm; but it has gone on exactly as the paroxysm which immediately preceded. In *other instances*, the paroxysm has continued longer; and the crisis and intermission have been more imperfect: but he never met with a case in which the paroxysm stopped or became shorter, or where the crisis was more perfect, than was to have been expected if no medicine had been exhibited.---A conclusion to be drawn from this is, that the bark of the cinchona, (and probably all the medicines that act in a similar manner,) have no power of taking off a fever *when present*; but only a power of *preventing a return*: or if they have any action on a fever when present, they tend to prolong it and *prevent a perfect crisis* from taking place.

There appears no doubt but that the effects of the cinchona are produced by the *impression it makes on the stomach.*---About twenty years ago many very irregular and obstinate intermittents were found in laborers, who had come from the fenny parts of Lincolnshire, and were admitted patients into St. Thomas's Hospital. These intermittents baffled the efforts of the physicians of the hospital; (of whom the author was one.) The late Dr. Huck* tried the various modes that had been recommended by authors for employing the cinchona. Among other modes of exhibiting it, half an ounce of the powder was sometimes given, (in some cases an ounce,) half an hour or an hour before the coming on of the paroxysm. In some instances the next paroxysm was prevented; in others, it was not. The author (following his example,) exhibited it in the same manner, and with the same effect.---The success was so small, as not to render it worth while to continue the practice; but it succeeded so often however, as to ascertain that when applied in this way it had the power to prevent the return of the paroxysm, if exhibited *an hour before the first stage of the paroxysm* would have taken place.---It is three or four hours after food is eaten, before chyle can be formed from it and be taken into the system. When the bark of the cinchona is exhibited in powder, it is therefore *not very probable that it should be any way so dissolved as to pass into the system* (or be absorbed by the lympatics,) in so short a time as *an hour;* and produce any effect on the fluids or any part of the system.---It is also at least very improbable, that more than an eighth of the bark should be extracted, and carried into the other parts of the system. But the eighth part of an ounce, exhibited an hour before the coming on of the paroxysm of fever, (or two, three, four, or eight hours,) will hardly ever have the effect of preventing the return of the paroxysm of an intermitting fever.---It happens not uncommonly, that an hour after the exhibition of so large a dose, vomiting takes place; and a great part of the powder is thrown up; (often, as far as can be judged, almost the whole): yet in some cases the intermittent is prevented from returning; from which it may be concluded, that its effects must have arisen from its operation on the stomach. (However there may be fallacy in this case; as *vomiting*, from an emetic exhibited just on the coming on of the paroxysm, may have prevented the paroxysm.)---Another reason for believing the effect of the cinchona to be owing to the impression it makes on the stomach, is; that no alteration can be discovered in the solids or fluids of the body, after it has been exhibited.

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* It is believed, that he was afterwards called Dr. Huck Saunders.

Supposing it therefore to be proved that the powers of the cinchona arise from the impression it makes on the stomach; the question is, *how long does that impression remain?*---When a medicine makes an impression on a part on which it can act, (and which is called in consequence an irritable part,) the impression remains much longer than impressions on the organs of the senses. When, for example, any stimulating substance, (such as cantharides,) is applied to the skin, so as to produce heat and redness, but not a permanent inflammation, (which appearances continue, independent of the stimulus applied;) the heat and redness do not go off in less than half an hour; which is much longer than any impression remains on any of the organs of the senses, after the sensible object is removed.---The length of time the impression remains in preventing the return of the paroxysm of fever, when made on the stomach by the cinchona; has been proved to be considerable, by the experiments made by many physicians. The author has tried it in several regular quartans, where the intermissions lasted sixty hours, and were perfect. A drachm of the cinchona given every hour for sixteen hours, at the beginning of the intermission; and discontinued for the last forty four hours: has prevented in several cases the return of the fever.---From this it is evident that the impression made by the bark on the stomach *lasts at least forty four hours.*

A dose of bark therefore exhibited at the beginning of the intermission of a regular tertian, will have such an effect as to tend to prevent its return. Hence this medicine should be exhibited *during the whole time of the intermissions;* as the impression made by every dose will have an effect in preventing the return of the paroxysm.

[FARTHER HINTS AND RULES RESPECTING THE USE OF THE BARK.]

1st. It might be *imagined, that a small quantity of the bark* of the cinchona may be exhibited at first, and in *solution;* (so as to have the least chance of producing sickness and uneasiness of the stomach:)---and that if found not sufficient to prevent the return, a larger quantity might be exhibited afterwards: or that if a solution could not produce the effect, it might afterwards be employed in *powder.*

---*But* the author has been led to conclude from many observations, that, if the cinchona be exhibited in such a manner, as *not to prevent the return of the paroxysms in the course of a few intermissions, its effect is generally lost;* and that it never can be exhibited afterwards in any dose, or in any manner, so as to produce its effect in the manner it would have done, if employed in a *proper dose and mode from the first.*---(Frequently its power of preventing the return of the paroxysm is totally lost; and therefore it is of the utmost importance to use it at the beginning in such preparations and quantities as to be effectual.)

2*d.* Where a first attack of fever goes through its three stages, terminating in crisis, *although not absolutely perfect;* the bark of the cinchona may be exhibited *immediately after such a paroxysm;* and will often prevent the return of the fever.—(It is true, that in such cases it is by no means certain that the fever would have returned: but as it most frequently does, in cases where slight symptoms of the first stage remain; it is more advisable to give the patient the slight inconvenience of taking a small quantity of bark, than to hazard the risk of the return and continuance of the disease.)

3*d.* If a first paroxysm is gone through, and very considerable intermission has taken place, and no means have been used to prevent a return; should *another* paroxysm succeed, terminating in *crisis,* although not quite so perfect as the first; still the cinchona may be employed without disadvantage, to prevent the return of the third paroxysm.—It often happens, however, that the subsequent intermissions become less perfect, and the fever acquires the *force of habit;* and if the bark be exhibited during these imperfect intermissions, *it will not with certainty prevent the recurrence of the disease:*—So that where the first intermission is passed over, an opportunity is frequently lost of employing the cinchona with advantage *for some time.*

4*th.* When an intermittent has begun with very little intermission or remission at the very first, and the *intermissions have become gradually more perfect;* and the cinchona has been exhibited *before* they have acquired a sufficient degree of regularity; its preventing a return of the paroxysm *has been very uncertain;* (or if it should have prevented the paroxysm from returning for once or twice, the disease has often returned in five or six days, although the cinchona has been continued.)---This is, however, a matter of great controversy among practitioners; some insisting that cinchona should be exhibited as soon as there is a crisis, however imperfect.---In a temperate climate (such as that of England) and in a person of tolerable strength; either when the intermissions are very imperfect from the first, or when the first or second have been more perfect and the exhibition of the cinchona in them has been neglected; it is *better to wait till they become perfect*, before the cinchona is exhibited; even if it should be as long as eight or ten days. The cinchona (it is true,) will frequently prevent the next return of the paroxysm, exhibited in any part of the disease; but its force is often entirely thrown away by this imprudent use of it; (so that it will not prevent the returns at the moment, nor afterwards cure the disease.)

5th. When the irregularity of the intermissions oppose the use of the cinchona, the intermissions may be made more perfect by *keeping the primæ viæ in proper order, by means of emetics and laxatives*;--and by producing *more perfect crises by preparations of antimony, &c.* ---By these means, intermissions are frequently rendered nearly perfect after two or three paroxysms, that would have remained as many weeks imperfect without them; besides, that there is thus a chance of removing the disease entirely by these remedies.

6th. When a tertian has continued *regular during two or three months*, and the cinchona never has been exhibited; and has become imperfect again; although the intermissions have been very irregular, the author has found the cinchona efficacious in preventing their return.

7th. With regard to the exhibition of the cinchona, it has already been said that it should be given *in powder*.---Where there is *perfect intermission at the beginning of the disease*, the opportunity should be seized of employing it *without any previous medicine* being exhibited whatever; so as to prevent the disease from being fixed by habit.

8th. If the intermissions should continue *tolerably perfect after the second intermission*, it is always better to *clear the primæ viæ* by an emetic, and a laxative (such as rhubarb); before the cinchona is exhibited. The time of one paroxysm only is lost, and the remedy is rendered much more certainly efficacious.

Where the intermissions *have been very imperfect* from the first or have become so afterwards, and then have *grown naturally more perfect*; the emetic and laxative should *precede* the exhibition of the bark of the cinchona.---If the intermissions have been rendered *more perfect by these means*; the cinchona may be immediately employed without *any other* previous remedy.---If the intermissions [illegible] The [illegible] during the [illegible]: [illegible] at the [illegible]

[illegible] an hour before [illegible] during the time [illegible] will [illegible] during [illegible] is true. [illegible] will be treated [illegible] in the [illegible] the time to [illegible] is taken; [illegible] large and fre- [illegible] have [illegible] the [illegible] been very much [illegible]

[illegible] has been prevented [illegible] be em- [illegible] will take place [illegible] it had never been prevented.---*Several means have been employed to prevent this reproduction of the disease.* The first and most efficacious, is to continue the use of the cinchona; by employing it in the same dose as at first, at the time that would have been the time of the intermission after the paroxysm that was prevented by it; (employing it as frequently as during the time of the first intermission.) It should be discontinued at the time when the subsequent paroxysm should have recurred.---And the same practice should be repeated during the time of the next intermission. (That is, if the tertian had commenced at twelve at noon on Sunday, and completed its stages by midnight; a drachm of the cinchona should be exhibited at one on Monday morning, and continued every two hours till eleven on Tuesday morning. It is then to be omitted till one o'clock on Wednesday morning; when it is to be given in like manner till eleven o'clock on Thursday morning. It is then to be omitted till one o'clock on Friday morning: when it is to be exhibited till eleven on Saturday:)---And afterwards discontinued altogether for a time.

12th. Many practitioners *deny the necessity of this long use* of such a quantity of cinchona; having frequently cured their patients in a shorter time, and with much less doses:---but they have also very frequently failed.---This failure is usually attributed to the badness of the cinchona, to the particular constitution of the patient, to relapses produced by new causes, and to a thousand other things. But the author is convinced from his frequent trials of it in all ways, that in order to insure success it must be exhibited as above directed.---This even is not sufficient to insure success perfectly; but an ounce should be exhibited during the day time, *at the end of six days, for two days;* and again in the same manner, after an interval of *six days more.*---(The author cannot help again repeating the necessity of exhibiting the cinchona in this manner; having been so often disappointed when it was otherwise used; and having so frequently found that this medicine, *when once given so as to fail in its effects,* generally loses the greatest part of its efficacy in afterwards preventing the return of the disease.)

If the *bark should affect the intestines as a purgative;* it is a common and proper practice to exhibit *opium* to prevent this effect.---The opium ought to be employed so as to act on the intestines con-

[illegible] used with efficacy. A third part of a grain (or its equivalent in any of its preparations) should be given: and repeated at the end of every sixth hour.—It may be mixed with the dose of bark which falls to each due period.—When on the other hand, the peristaltic motion of the intestines is prevented from going on, the natural evacuations ought to be promoted by rhubarb, or some other gentle laxative: for purgatives ought by no means to be exhibited so as to make large evacuations.

Another means of preventing the returns of the paroxysms, is by producing a Sweating Fever at the time that the paroxysm should take place.—Various modes of producing this effect have been attempted. The most efficacious is to exhibit a wine of some kind, with opium and tartarised antimony (or any other efficacious antimonial preparation): or wine or spirits with opium, volatile alkali, and ipecacuanha: the formulæ of which are in the author's Elements of the Practice of Physic.—These medicines should be given about an hour and a half before any sensible appearance of the paroxysm is expected: the patient should be in bed, in cotton or flannel; and in this climate the room should be heated (in winter to 55°, in summer to 65° or 70°): warm diluent fluids, such as barley water, should be exhibited in the quantity of two or three ounces every five or ten minutes, and in such manner, as that the patient should not be obliged to raise himself from under the bed clothes: from the spout of a tea pot for example. The head should be bound round with cotton or flannel, and more bed clothes should be used than the patient is commonly accustomed to.—By these means a profuse sweat can be produced at the time when the paroxysm of the disease should have come on: none of the symptoms of the attack will make their appearance; and in several instances the paroxysm is entirely prevented.—(Exhibiting some very stimulating purgative, which affects the whole system, about six hours before the use of these remedies; renders them more efficacious:—Such as a mixture of scammony, gamboge, aloes and jalap: given so as to produce five or six evacuations, and so as that their purgative effects shall be entirely over by the time the sudorific remedy is to be employed.)—The advantage of such purgatives is from the disposition to sweating which they cause, after their purgative effects are over: even when no sudorific remedy is made use of; and the consequent increase of the power of the sudorific.—Purgatives were originally exhibited with a view of evacuating *noxious matter;* which effect however there is no reason to think is produced by them.

(It is as little understood how the disease is prevented by these remedies; as by the use of the cinchona, or any other remedy acting in the same manner.)

Whether this practice might be used advantageously, where the first and second intermissions are perfect, and the subsequent ones become imperfect; is not known.—Where the first and second intermissions have been tolerably perfect, and the subsequent ones for some time have become imperfect; it cannot be employed with advantage while they are very imperfect. Where the intermissions at the beginning are nearly perfect and continue so; or where they are imperfect at first, and afterwards become perfect, or nearly so; these sudorifics may be used advantageously.

There is one *exception,* however. When towards the beginning of the disease appearances of *general inflammation* arise, (such as hardness, fulness, and strength of the pulse during the intermission,) there is some doubt whether they have not a tendency to produce *topical* inflammation. (This is however merely a theoretical idea; as there is no proof of deleterious effects arising by the use of them under these circumstances.)---But when *inflammatory symptoms about the thorax continue during the intermission,* (such as considerable difficulty of respiration, violent cough, pain in the side, with hardness of the pulse;) *hæmoptoe* is apt to be produced by them.

When the *intermissions become again imperfect towards the end of an intermittent,* after having been perfect or nearly so; a *sudorific* may in several instances be efficaciously employed.

A *sudorific remedy* is rarely efficacious, when it does not produce sweating at the time the paroxysm should have recurred: sometimes however, even in *this* case, it prevents it. This shows that it is not merely sweating that prevents the paroxysm from returning; but that the sweating is perhaps only a collateral effect of the medicine; and a sign of its acting thoroughly.---On the other hand, although sweating should be produced, it sometimes happens that the paroxysm takes place; the sweating ceasing at the time of or soon after the attack, and during the hot fit; which however is generally very much shortened. In many cases the crisis which follows, is rendered more perfect; and the whole disease assumes a milder aspect.—It might be supposed that by repeating this remedy in the next intermission, where the paroxysm has not been prevented; the following paroxysm might be prevented. This happens sometimes. —The patient however is so much exhausted by these exertions, (especially if a stimulating purgative had been used;) that it is not proper to employ them, at least in the subsequent intermission. If the purgative had not been given, it may be used in the following intermission: so as sometimes to produce an effect, and prevent the next paroxysm from returning.

The exhibition of a sudorific remedy in this manner has not been much practised. It is one of the modes that have been used to prevent the return of fever; which sometimes succeeds; although not so frequently as to put it into competition with cinchona, where cinchona can be employed properly.

Antispasmodics, (such as musk, opium, empyreumatic oil, ether, &c.) exhibited just before, or at the time of the coming on of the paroxysm; sometimes prevent it, without proving at all sudorific; but so seldom, as not to be worth serious attention.

Another means of preventing the paroxysm from taking place, is *to excite some passion of the mind very strongly*; of the success of which there are instances, although few.---One, for example, was of a patient, a man in the twenty ninth year of his age, in the third month of a quartan; where the intermissions were regular; and took place at two o'clock in the afternoon, and in the winter. His brother led him to walk by the edge of a mill-dam and pushed him suddenly in; which produced great terror, as he was unable to swim. He was taken out, and the paroxysm was prevented from taking place; and no farther attack of the disease arose.

By *exciting inflammation of the skin* in any part of the body, so that the inflammation may be considerable at the time the paroxysm should take place; it is sometimes prevented, and the disease cured.---Hence bracelets of mustard seed and garlic have been applied to the wrists and ancles; which sometimes have had an effect. Similar remedies are however so seldom efficacious, that regular physicians have rejected them. Empirics have sometimes employed them; and when they chance to succeed in their hands, they are supposed by the vulgar to have a miraculous effect.

(Sudorific remedies exhibited just before the coming on of the paroxysm, have been ranked with these very uncertain remedies; yet after the cinchona and other medicines of the same kind, they are the most efficacious that can be employed.---Sudorifics are however not to be put in competition with the cinchona; where it is proper to exhibit the latter. But supposing the intermissions not quite so perfect as to render it prudent to employ it; or that it has been so employed as to have lost its effect; sudorifics are then of great value: because if they should not absolutely prevent the return of the paroxysm, they often render the next intermission more perfect; so as that the cinchona may be exhibited with advantage.)

The following then are the remedies which have been employed to prevent the return of the paroxysm of a regular tertian.---That is; first, *the producing so perfect a crisis,* as that no symptoms of the first stage shall remain after it has taken place; in which case frequently no subsequent paroxysm occurs.---Secondly; employing the bark of the cinchona or other medicines which (if exhibited during the intermissions) *prevent the return of the paroxysm;* without having any other sensible effect on the system.---Thirdly; employing medicines, just before the paroxysm takes place, which *throw the patient into a profuse sweat;* which prevents it from coming on at that time; and often carries off the disease.---Fourthly; employing *antispasmodics* at the time of the attack, or during the paroxysm; which prevent or diminish it.---Fifthly; *exciting inflammations;* which sometimes prevent the paroxysm from taking place.

Those remedies remain to be examined which appear *not* to have a beneficial effect.

The first of these is evacuation by *bleeding;* a powerful remedy in many diseases; but in a regular tertian intermittent, it has not the least effect in preventing the paroxysm from taking place, or rendering it more regular, or inducing a more perfect crisis, or making the intermissions more perfect.

There seems to be a great error in the view of remedies employed in fever; practitioners frequently making no distinction between those used to cure the disease itself; and those employed to remove *accidents* that have arisen in it.---If, for example, in the course of a tertian, a pleurisy should happen to arise; taking away a quantity of blood would be a powerful remedy for the pleurisy; but although the pleurisy were removed, the intermittent tertian would go through its course just as if no blood had been taken away, (excepting that the patient would be rendered weaker.)

Those who are uninformed in medicine, expect that diseases are to be cured by *violent* remedies and suddenly; (and the attention of by-standers is thus often drawn to practitioners who employ strong acrid medicines.)---This has frequently induced practitioners to use medicines the most violent in their apparent effects; supposing that they would also be the most efficacious in curing the disease: while practitioners really well informed, find it often more proper, to leave diseases to go through their natural course; though they are careful not to let slip an opportunity of employing a remedy that is efficacious in their removal.---This subject will be more amply treated of in the dissertation on the management of regular continued fever.

Purgatives have often been employed in regular tertians, with a view to carry off certain humors supposed to occasion the disease. But it has been found, on the other hand, that purgatives have reproduced the disease, after it has been carried off by other remedies; and that, (excepting so far as they prevent costiveness, and excepting also the use of stimulating ones designed to assist the action of sudorific remedies,) purgatives tend to render the disease longer in its paroxysms, and the crises less perfect.

Evacuation, either by bleeding or purging, is hurtful; (in so far as it weakens the patient, and renders him less able to bear the repetitions of the paroxysms): although not so highly prejudicial as in *continued* fever;---(for in the intermissions there is time for food to be digested, so as to replenish the blood vessels.)

In this Dissertation the ground gone over is trodden and tolerably plain:---the remaining parts of the subject are more difficult. The author nevertheless means to pursue them (according to his ability,) until the history of fever be completed by a third dissertation, viz. on a regular *continued* fever;---by a fourth on *irregular* intermittents, and the *accidents* which happen in them;---and by a concluding one, which will contain the history and manner of treatment of the *accidents* which happen in *continued* fevers, and their irregularities.

A
THIRD DISSERTATION
ON
FEVER;
PART I.
CONTAINING THE
HISTORY, AND METHOD OF TREATMENT,
OF A
REGULAR CONTINUED FEVER,
SUPPOSING IT IS *LEFT* TO PURSUE ITS ORDINARY COURSE.

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and leaves the patient. Or otherwise, a crisis takes place during some part of its progress; either carrying it off altogether, or converting it into an intermittent.

A fever is a disease of the *whole* system:---so that if a disease of a part should go off, while the *cause* remains; and the system should not be generally affected in a greater or less degree; it ought not to be considered as fever.---One criterion of a regular continued fever is, that it increases for a certain time from its beginning; remains for some time in its greatest degree, or (as the Greeks call it) acmé; then, without any apparent cause, *gradually* diminishes and terminates in health.---Or otherwise; a *crisis* takes place during its progress, and carries off the disease; or the crisis converts it into an *intermittent;* or otherwise in its progress it produces *topical inflammation;* or else it kills the patient.---Any disease, not having these qualities, is *not* a regular *continued* fever.

The author has before remarked, that when a cause is applied which produces fever, it produces it *uno ictu,* (at a blow); and the disease continues afterwards, although the cause be no longer applied: neither is it increased, diminished, nor altered by the farther application of its cause.---The author, therefore, would not admit any affection of the general system to be a fever, which depends upon the *constant application of the original cause.*

Should a disease arise with frequency of the pulse, and other affections of the whole system; and these general affections not be such as are commonly found in fever; (that is, if there should not be contraction of the vessels, depression of strength, affection of the stomach, &c.) although the disease should arise from a cause, the continuance of which is not necessary for the continuance of the disease; and although the disease should gradually increase, remain for some time with a certain degree of violence, then gradually diminish and go off;---nevertheless it must not be considered as fever.

The following *Rules* may be applied for distinguishing the several diseases which have been erroneously called *Fever,* from that disease.

When a disease has a tendency, after having increased to a certain degree, to diminish gradually, and go off without any apparent cause: This is a property of fevers; but not of fevers only.---*Acute rheumatism,* when no medicine whatever is exhibited, increases for a certain length of time; rises to a certain height; continues for a time in an equal degree; then gradually abates, and leaves the patient. *Hemicrania* increases for a time, then continues in the same state, (although a much longer time than acute rheumatism,) and afterwards leaves the patient, without any apparent cause whatever; seeming only (if the expression may be used) to grow tired of a longer stay.---(Some cause, however, there must be for all such increase and diminution; although it has not yet been discovered.)

This criterion of fever, therefore, is unfit for universal application; —but it may be applied in many cases; as for distinguishing the disease called *hectic fever*.---This disease sometimes agrees with regular continued fever, in arising without apparent cause; but it commonly arises from, and is kept up by, the constant application of an apparent cause. There is coldness, paleness, and other symptoms of depression of strength and contraction of the small vessels: these are followed by heat, frequency of the pulse, foulness of the tongue, and other symptoms of the hot fit of fever. The attacks and subsequent apparent hot fits take place in the evening, terminating in the morning; often with several critical symptoms. Sometimes indeed the attack happens in the day time; but not commonly.—This disease has been frequently called fever; but it wants this essential property; that where it does not arise from an apparent cause, and often even when its cause is removed, it has *no disposition to go off of itself;* but remains, until it destroys the patient. —This want of means of curing itself, excludes it from the class of fevers.

In *tetanus*, contraction often takes place in the muscles of various parts of the body: (continuing for certain length of time, without any apparent intermediate relaxation;) the general system is often affected: and the pulse becomes frequent to a hundred and twenty strokes in a minute or more: there is, however, no other appearance of fever in the system: the patient is often in a profuse sweat, the tongue is clean, and the stomach not much affected. This affection of the system often arises without any apparent cause; and frequently after some other disease has gone off, (as after the cure of a fever or the healing of an ulcer): it then increases to a certain degree, continues for a certain length of time, diminishes, and goes off.—The *same affection of the system* arises not uncommonly, with little, or without any *spasmodic contraction* of any of the muscles of the body. Although this case has not been remarked by any writer the author is acquainted with; yet he has seen it several times. *First*, where there has been spasmodic contraction in particular parts of the body; and the affection of the system has been greater than in proportion to such spasmodic contraction: *Secondly*, when there has been no spasm in any part; the affection of the system subsisting without any continued cause applied.—This affection cannot be called fever; because it totally disagrees with it in its appearances.

Should a *phlegmonous inflammation* arise in any part of the body of a strong young person, distending the part considerably, and be accompanied with violent pain: as the inflammation increases, the pulse becomes hard, full, strong, frequent, and synchronous; considerable degree of heat and of general tension takes place all over the body; the tongue is covered with white fur; the patient has head-ach (feeling as if his head would burst); pains occur in the extremities; and great sense of heat. These appearances gradually subside, when the phlegmonous inflammation has suppurated and the pus has made its exit externally: they are therefore kept up only by a constant apparent cause; and are consequently excluded from fevers. Or should the inflammation be cured by any means, this affection of the system also goes off in the same manner:---(so that the affection of the system evidently depends here on the topical affection; and therefore it is not fever).

Should *rheumatism arise* in any part of the body, all the appearances in the system just enumerated take place; and often continue as long as the rheumatic affection continues in any part or parts of the body.—But when the rheumatic affection has gone off, these appearances gradually subside also; and leave the patient.—Sometimes, when the rheumatism is not in fact cured; but has left the patient, in appearance free from disease; after a short pause, a metastasis takes place to the head or breast, and soon proves fatal.—This remission of the symptoms is nothing like an intermission of fever; for which reason it is here noticed.

Similar appearances take place in the system, in the *gout and in other diseases* which depend entirely upon their apparent cause;—increasing as that cause increases, diminishing when it diminishes, and going off when it is removed.

These appearances have often been called *inflammatory fever*, *or* *general inflammation;* but are excluded from the class of fevers by their dependence upon their cause.

Should *erysipelatous* inflammation arise on the *skin;* it often happens (after the inflammation has taken place,) that the pulse becomes frequent to 120 strokes in a minute or upwards; the strength of the patient is universally depressed; there is head ach, foulness of the tongue, loss of appetite, and nausea; the sense of heat is very much increased; as is the degree of heat (to 100°, or 103°, or 104°); there is dryness of the skin; and obstruction of the pulse. These symptoms are all very much increased in the evening; and there is some degree of relaxation of them in the morning.—This disease is extremely similar to fever; yet it is to be excluded from that disease by its total dependence upon its cause, (the erysipelatous inflammation of the skin): for if that be removed by application of alcohol diluted with water, to the inflamed part only; all these affections of the system generally go off.

Should an *erysipelatous* inflammation arise in the *Throat,* producing whitish sloughs in it; similar symptoms appear in the system:—but if the inflammation be carried off by the exhibition of large quantities of the bark of the cinchona, and the whitish sloughs be made to fall off, (so that all disease shall be removed from the mucous membrane of the throat;) the affection of the system generally ceases.—This affection of the system, therefore, cannot be ranked among fevers; according to the rule, which excludes from fevers diseases depending on the constant application of their cause.

Should *phlegmonous inflammation take place in any part of the duodenum, jejunum, or ilium;* and after the inflammation has taken place (as shewn by the pain,) if the strength be greatly depressed; if the pulse should become hard, and frequent to 120 strokes in a minute or upwards, and much contracted; if there should be a thick brown fur upon the tongue, great sense of heat, head-ach, paleness, and contraction of the skin, with nausea and vomiting; if there should even be delirium:—Yet let the inflammation of the intestines be cured by copious bleeding from the arm and skin of the abdomen, and by the application of sedative and relaxing fomentations to the abdomen;—and all these symptoms in the system generally will subside and go off. They cannot therefore, form a disease which ought to be included in the class of fevers.

In treating of the ephemera it has been observed, that in the middle of the hot fit, a *Topical Inflammation* sometimes arises; and carries off the fever.—Thus, for example, in an hour or two after all the appearances of a paroxysm of fever have taken place; a pain arises in the side, a little below the clavicle. The pulse either was *before* the pain in the side took place, or it becomes *afterwards*, very hard, full, and strong; (accompanied with difficulty of breathing, increased pain of the side on inspiration, and all the other appearances, which would have arisen had a phlegmonous inflammation taken place in the pleura;) without any preceding cold or hot fit. In the latter case [where the derangement in the circulation *followed* the pain;] if large evacuations be made by bleeding, from the arm and skin of the breast; the inflammation of the pleura is carried off: and every morbid affection of the system ceases in consequence.—But it sometimes happens that the inflammation being carried off from the pleura, (that is the pain having left the side and the difficulty of breathing having ceased;) the frequency of pulse, heat, and all the other symptoms of fever, *remain* notwithstanding; and go through the course of a regular continued fever.---This case the author finds a difficulty in discriminating;---but he conceives that an ephemera had taken place in the first instance; that the inflammation of the pleura had cured this ephemera; that the inflammation being carried off (by the evacuation or other remedies,) no fever remained in those cases, where the symptoms entirely ceased on the cessation of the inflammation;---but that when the febrile symptoms continued after the pleurisy was cured, a regular continued fever had been diminished by the inflammation of the pleura, but was not entirely carried off by it; and that therefore when the pleurisy was cured, the fever went on as it would have done, if no such inflammation had happened.

It may be said, that it were *more simple*, to consider all these affections of the system, *as fever*. But it has been always thought, that in scientific subjects, nice *distinctions should be made* where they actually exist; in order to discriminate the natural properties of bodies.---In botany, for example, a superficial observer would rank together all beautiful and sweet scented plants under the name of flowers; all plants whose seed gives nourishment to mankind, under the name of grain; all plants whose leaves, stems, or roots are eatable, under the name of pot-herbs; and reckon all others as weeds: while the botanist would carefully distinguish between the figures and qualities of plants similar to each other in any one respect.---Some consider all noises the same: a musician carefully distinguishes a semitone.---Were diseases studied *merely to investigate their properties*, it would still be worth while to enter into accurate and minute distinctions; but they become of much greater moment, when the object is to *alleviate and remove the disease.*

One object in view in laying down the above distinctions, is to discriminate between those diseases where it is only necessary to *remove their cause*, to cure the patient: and those, where *other circumstances of the disease* are of moment.

In what is called *hectic fever*, (which often continues *after its cause is removed*,) as it does not produce any means for its own cure; some must be employed to carry off the disease, without attention to its own ordinary progress.

If a disease depends *solely upon its cause*, it is sufficient to remove that cause; and in general, attention to the disease itself is unnecessary.---Should a *phlegmonous inflammation* produce the appearances similar to those of a paroxysm of fever; medicines are to be employed that will *carry off the topical inflammation*, without attending to the general affection of the system; (excepting that this general affection must sometimes be considered as an accident that may in itself be mischievous). Where phlegmonous inflammation *cannot be cured*, (if it should not prove fatal, from affecting some organ necessary for life,) the inflammation must be allowed to *suppurate*: and the suppuration must even be forwarded very frequently by means increasing the general affection of the system; instead of employing medicines to diminish or remove it.---Whereas *in Fever*, on the other hand, the whole attention is directed to the application of remedies that will either remove the disease; or make it go through its natural course without danger to the patient; or with a less degree than it otherwise would possess: but totally *neglecting the cause* which first produced it.

General inflammation excited by a disease affecting some part necessary for life, might however be fatal; *independent* of the topical inflammation which occasioned it. In this case it would be necessary to employ means to take off the general inflammation: but they are commonly the same as those which take off the topical inflammation;---and totally different from those that should be employed to take off fever.

When *Rheumatism* excites general inflammation, the general inflammation frequently appears to be the principal disease; and until lately, practitioners have thought that it ought to be carried off by large evacuations, especially by bleeding.---Dr. Hugh Smith (an extraordinary practitioner) conceived that the evening attacks of violent pain, frequently happening in *acute rheumatism;* were the returns of the paroxysms of an intermittent. He therefore exhibited the bark of the *cinchona*, in the quantity of an ounce and an half, during the interval of the pain; although the pulse continued hard, full, strong and frequent: and thus succeeded in preventing the return of the pain.---This practice has since been adopted with success by many practitioners.---Some have even employed the bark of the cinchona, where there was no remission of pain; but in the cases the author has seen, without effect.---While it was the practice to remove the general inflammation by *bleeding;* metastasis frequently took place to the interior parts of the body, and destroyed the patient. This accident in the author's practice during the last fifteen years, has rarely happened.---In this period, he has entirely left off bleeding in acute rheumatism; and has not lost above two or three patients; although he has treated several hundreds in this disease.—This may be considered as a digression; but it is intended to shew, that general inflammation, in this case, has nothing in its treatment similar to fever.

If in the *Gout*, or in *other diseases where general* inflammation takes place, (unless it were so violent as immediately to threaten the destruction of the patient,) large evacuations by bleeding should not be made; nor any means be employed to carry it off, which would increase the original disease: yet still in managing the gout or other such diseases in the best manner, remedies must sometimes be employed which evidently tend to *increase* the general inflammation.

If in consequence of an *Erysipelatous inflammation of the Skin*, the pulse should become frequent to 120 strokes in a minute or upwards; and there should be universal depression of strength, and other symptoms of general affection of the system: they ought not to be attended to;---but solely the erysipelatous inflammation of the skin; as on the cure of that, the affection of the system would cease.

In *Erysipelatous inflammation of the Throat*, producing whitish sloughs in it; the practitioner should endeavor to carry off the erysipelatous inflammation and remove the sloughs, without attending to the frequency of pulse, heat, or any part of the affection of the system generally.

If from *inflammation of the duodenum, jejunum, or ilium;* there should arise great depression of strength, frequency and smallness of the pulse, with other symptoms of general affection of the system; an experienced practitioner would not employ cordials or Peruvian bark, to support or increase the strength; nor would he attend at all to the general affection of the system;---but would endeavor to cure the inflammation in the intestine, without paying the least attention to the general affection of the system.

If an attack should take place *similar to the attack of an ephemera,* and *violent Pain should arise in the Side,* a little under the clavicle, increasing upon inspiration; the pulse becoming hard, full and strong; and other symptoms of general inflammation taking place;---if by making large evacuations by bleeding from the arm and skin of the breast, by blisters and other remedies, the pain should be entirely removed from the side; and yet the general affection of the system should not go off; that general affection is then undoubtedly to be attended to.---If during the existence of the *pleurisy,* a practitioner is enabled to determine that although the pleurisy should be carried off, the affection of the system would still remain; in this case, the general affection is to be attended to, both during the pleurisy and after it is carried off.---These distinctions, however important, have hardly ever been made matter of inquiry.

A *regular continued fever takes place exactly in the manner of an ephemera, or a regular tertian;* nor would it be possible from the appearances of the disease, to determine whether it would be an ephemera simplex, a regular tertian, or a regular continued fever.---The circumstance of a patient's living in a country, where intermittents were endemic, from moisture or putrefaction arising in marshy grounds, in warm climates; or of intermittents being (from any cause) epidemic in dry countries: might make a practitioner *suspect* that the disease would be an intermittent or remitting fever.---But without such circumstances, no appearance in the patient himself, would, (within two or three hours of the attack) at all enable him to determine what kind of fever it would prove.

Continued fevers sometimes then *begin at once*, exactly with the same symptoms as an ephemera.---At times, however, there arises immediately upon application of the cause of disease, (particularly if it should be exposure to cold, putrefaction, or infection,) *some derangement* of the system; but *no complete paroxysm of fever*. These derangements consist of languor; the patient's feeling himself not perfectly well; and being unable to exert the powers of his body or his mind (whether for business or amusement) so perfectly, as when in absolute health. Sometimes his sleep is disturbed; he does not go to sleep readily; his sleep during the night is broken; and he is not refreshed so much as usual.---It happens sometimes that these symptoms go off in a few days: sometimes they all at once increase very considerably; and form a paroxysm, which is the beginning of the fever.

The state of SLEEP has been variously represented by writers upon it, whether physicians or metaphysicians.---The *Effects of Sleep* in fever, and particularly in continued fever, are so great; that it may be necessary for the author to state his ideas on the subject.

Whence or how the Powers of exertion and the various operations, *either of the Body or Mind*, are *produced;* it is impossible to say: or at least every thing that has hitherto been said on the subject, is visionary.---It has already been observed, that the *Power exerted by the Muscles* is not derived from any mechanical or chemical construction or operation; but that it is an *Original power* arising from the *Life of the animal.*

This power may be infinite, so that all the *Muscles* may be able to exert themselves constantly with an infinite force; *or* it may be finite, so that the muscles of the body may act altogether with a certain force, and constantly continue that force of action; *or* a certain number of muscles may occasionally exert all the force of the body, (the others being at the same time necessarily at rest.)---We find by experience that the force is *not infinite;* and that only a certain quantity of it can be exerted in a *given time*. It may be exerted either in all the muscles at once, or in a certain number of them; the remainder being at rest: (but no man can lift above a certain weight; therefore the force is not infinite.) A man cannot run with velocity, and strike at the same time an equal number of blows of equal force with his arms, with a man keeping the muscles of his lower extremities at rest.---A man *might* be able, either to exert his utmost muscular force *constantly;* or it might be necessary for him to come to a *Rest,* after having continued to exert his utmost muscular force a certain time; and to remain sometime at rest, (before he could again exert it.) The *latter* is known to be the case; (that is, when a man has exhausted himself by labor, it is necessary that he should be recruited by rest.)

The *Rest* from *muscular* exertion is *not, however, absolute rest;* for there are some of the muscular exertions of the body which must always be carried on, in order that a man should live. It is necessary, for example, that the muscles of the organs of respiration should continue to expel vapors from the lungs as they become unfit for the purposes of life: and to draw in fresh vapors, (otherwise the life would be lost); that the heart and arteries also should be in constant action; that such muscular powers as form the tone of all the moving parts of the body, should be constantly exerted, &c.---The *body* in short, may be compared to a machine, moved by a stream of water always sufficient to keep *some* parts of the machine in action; but *not the whole.* If a dam be formed, leaving an outlet for part of the water sufficient to keep certain necessary parts of the machine in constant action; the remainder may be retained for a time; and on opening a sluice, the water treasured up will set the whole machine in motion; and continue its action until the dam is emptied.---After a man has been at rest for a certain time, it is not necessary that he should exert the power he has re-acquired: he may, if he pleases *continue* (in a certain degree) *at rest.*

In *fever,* not only the body is affected; but often the *Mind* also.---It may, therefore, be necessary to make some investigation of the *Powers of the Mind.*---(It is, however, by no means intended to treat of the powers of the mind or its properties, as they relate to diseases of the mind; but only in so far as they are connected with diseases of the body, particularly with fever.)

The *powers of the mind* are—1st. *Perception;* that is, the power of receiving impressions from the organs of sensation. The organs of sensation are of a particular construction, by which some alteration is produced in them by external objects.---The eye, for example, (the organ whose operation is in this respect most evident,) has a membrane in it called the retina; upon which the image of an external object is painted, by the lenses of the eye: (so far the body contributes to the idea formed in the mind by an external object; and so far the perception is in the body.) Any thing in the body which prevents an object being painted on the retina, or painted with sufficient perfection; may be considered as a disease in the body preventing the perception of an external object.---Supposing the object is perfectly painted upon the retina; yet frequently no impression is made upon the mind, and no idea whatever is excited. This may happen without any disease of the mind, merely from its attention being withdrawn to something else: since the tree in St. Paul's church-yard has been painted perfectly on the retina of millions of people, without exciting any idea in the mind; (so much so as to be a common topic of jest books.)---This perception then must be considered as an operation of the mind, entirely separate from the painting of the object on the retina.—2d. The *second* operation of the mind is *Memory;* or the power of recalling ideas which have been formed by impressions made on some of the organs of sense: and it is certainly an operation of the mind alone.—3d. *Imagination*, or the power of arranging ideas in various ways; has likewise been considered as an operation purely of the mind.—4th. Lastly comes *Judgment*, or the power of determining whether ideas are properly arranged, and according to their original perception. The judgment, for example, would revolt, on having presented to it (by the imagination) a cow with a horse's head; or St. Paul's church placed in Pekin.

All these exertions of the *mind* are exertions of a *certain power:* but that power seems at first sight to be totally *different* from the muscular power of the *body;*---Yet there is certainly this *Connection* between them; that if the body has been fatigued with exercise, the mind cannot exert its powers of judgment; nor carry on any process by which it may determine the congruity of ideas.---A student in mathematics, having once acquired the knowledge subservient to the demonstration of a problem; would not be able, after having contended in an athletic game, to trace the steps by which that problem was demonstrated. On the other hand, a mathematician, after having gone through a new and laborious demonstration, would be unable to exert the powers of his body in a fox chase. Whether, therefore, it be the same power employed in the exertions of the muscles and the mind, or different powers; yet these powers are so *connected* together, that the exertion of the one will prevent the possibility of exerting the other in so great a degree, as might have been, had there been no immediate previous exertion of either.

The powers of the mind, (like the muscular power of the body,) are not infinite. A man cannot perceive, remember, imagine, and judge of an infinite quantity of subjects, at the same instant: he must first perceive, then remember, then imagine, and then judge. Neither can the imagination arrange an infinite number of different ideas, at the same instant; nor the judgment determine whether they are properly arranged; nor the memory bring up at once all the ideas it has in store; nor perception produce an infinite number of ideas at once. Hence it is evident, that the powers of the mind are no more infinite than the powers of the body.---The *mind* having exerted any one of its faculties for a certain length of time, can no more continue the exertion of that faculty; than a muscle, not necessary for the immediate purposes of life, can continue its motion. This renders it necessary, after the exertion of any of the faculties of the mind, that the faculty be allowed to *Rest* some time before it is again exerted.---If the powers of the mind be exhausted by the exertion of any one faculty, no other faculty of the mind can be exerted till after rest has occurred.—In all these respects the force of the *muscles*, and the powers of the exertion of the *mind*, are perfectly *similar* to one another.

There is one thing indeed which has been disputed by metaphysicians; namely, whether there be any *exertion* of the mind absolutely *necessary for its existence*, (as the respiration and the action of the heart are necessary for the existence of the body). It is not our present purpose to inquire into this:—All that is to be said is, that we do not know, either *a priori* or from experience, (that is, from reflection on the faculties of our own minds,) that it is necessary that the mind should perceive, remember, arrange, or judge of any set of ideas, in order to exist.

Upon the whole, therefore, in order to exert the powers of the *body* and the *mind* in their full force, it is necessary that there should be *intervals of Rest.*—The author conceives that *Sleep* is this rest; sometimes more, sometimes less perfect.

In sleep we shall, in the first place, consider the exertions of the *Mind.*

The *Judgment* (which is the most exhausting operation of the mind,) is totally at rest. Supposing even that the patient should dream, (that is to say, that the memory should present certain ideas and the imagination arrange them,) the judgment never exerts its powers at all. The mind never revolts at a cow with a horse's head, nor at the town of Pekin surrounding St. Paul's; nor whether St. Paul's is placed upon its base, or turned topsy turvy upon its cross and reeling.—*Imagination* is left to go on freely in a dream, without correction from the judgment. This is therefore certainly a great degree of rest as to the greatest exertion of the mind.—Although it frequently happens in sleep, that the *Memory* and *Imagination* are employed (or in other words, that a man dreams); yet it seems clear that *they* are at rest in a *certain degree.* If a man attends to what happens to him in a dream, he feels often that he has lost himself entirely; that is, as if the memory produced no connected series of ideas, but flew from one object, and apparently from one period of time, to another: he is totally lost in short, and wonders that he has found himself again.—That constant *Connexion of ideas,* therefore, which takes place when a man is awake, does not exist in sleep. The memory, then, and the imagination do not exert themselves so much in sleep, and so constantly, as when a man is awake.

Without entering into the controversy, whether the *memory and imagination* are ever *totally at rest;*—the *Powers* of *Perception* in the mind are certainly, in many cases of sleep, totally at rest; without any defect in the organs or the exertions of the body.—It is very true (as has been already observed) that the exertions of the *body* are often such, as put parts of it into situations, in which the *mind can take perceptions from it.* The muscles of the eye for perception must exert themselves so, as to give the lenses the proper convexity to paint objects which are at different distances, correctly on the retina. Therefore, should a man sleep in day light with his eyes open, (which has happened in a great number of cases,) the mind could not receive perceptions which are distinct, of objects which are at various distances. The lenses of the eye would certainly paint objects at a given distance very perfectly; but the mind would receive no idea from such painting.—Therefore the mind, while a man is asleep, is at rest, so far as regards the power of perception.

Here then *two exertions of the mind*, in tolerably sound sleep, are entirely at rest; the power of *receiving ideas from impressions from the* body: and the power of *judging* whether the imagination has properly arranged the ideas that may be represented to it.—There is certainly likewise a diminution of the powers of the *Memory*, in presenting ideas to the imagination; although perhaps not an equal diminution of the powers of the imagination in arranging such ideas; (which, without the correction of the judgment, would arrange them, as the wind blows, or as it listeth).—There are perhaps also (as has been contended by some metaphysicians) cases in which the memory presents *no ideas* to the imagination; which of course can make no arrangement of them: so that the mind is perfectly at rest.—In a *certain degree of sleep*, the mind perhaps neither receives any impression from any external object, nor has any ideas brought up into it; of course no ideas can be arranged; therefore arrangement cannot be judged of; (or, in common expression, a man does not dream at all, according to some metaphysicians). This happens (we may say almost undoubtedly) in *fainting fits*, *fits of epilepsy*, *hysteric fits*, &c.; where it was never known that any person, after coming out of them, ever remembered any *dream* at all.

If in sleep, therefore, the Mind is not at *perfect* rest; it is certainly at rest in a *very great degree.*

It has been already said, that the *Body* cannot exert itself always; but must occasionally come to a state of rest.—The *next inquiry*, therefore, is, *how far the body is at rest during sleep*, more than it is at any time *while a man is awake.*

The first thing, in which the different states are to be compared, is the *power of giving perceptions to the mind.*—The *Eye* is that organ, in which the power of the body in giving perceptions to the mind has been most completely discovered; although perhaps not quite completely. It admits rays of light; it collects them, and applies them to the retina, through transparent lenses; so as to paint there an image, corresponding to the body from which those rays of light were emitted. But in sleep, the eye-lids are generally shut; so as to prevent the rays from falling upon the retina at all; or at least the eye-lids are so opaque, as not to allow the rays to fall upon the retina, so as to paint any image at all. Therefore the power of perception in the body is, in this case, suspended and at rest.—The author might say from analogy, that the same thing probably happens in all the *other organs of the senses;* and that they also are at rest;—but he does not think that any truth can be deduced from analogy. It must depend only on future experience to determine, whether the Sensibility (or power of impressing an idea on the mind) by any of the other organs of sensation, is equally suspended in sleep; as the power of the eye.—In a tolerable sleep, therefore, the action of the Body, which makes the impression on the mind, (if not totally at rest;) is much *more at rest,* than when the body is awake.

When a man goes to sleep (supposing he is not prevented by any external accident), he puts himself in a *recumbent* posture; which is not a posture he commonly assumes when awake. In this position, in the first place, he is supported by a great many more points than when standing, sitting, or walking: therefore more points being pressed upon, it requires less exertion to avoid the effects of such pressure. (It is true, however, that the exertion might be equal; although it does not seem to the feeling to be so.)—In the next place, if a man is in an erect posture, it requires the exertion of a great number of muscles to keep up the equilibrium necessary for that posture; while no such exertion is required in a recumbent posture; every part of the body throwing itself in that situation, in which its gravity would place it.—So far, therefore, the body is more at rest when a man is asleep than when he is awake.—Moreover it is well known, that what is habitual is performed with great ease; whereas going out of the habit requires a very considerable degree of exertion. Now the fœtus in the womb is laid with its *body bent,* its knees brought towards the chin, and its arms folded. A man in health rather lies, therefore, in this posture, which he has acquired by habit; than exert himself against that habit. So far again he is at rest in sleep.—It is true that lying in this posture requires some *muscular exertion;* and so we see that those who have been reduced to a great degree of weakness, lie, even when awake, *upon their back;* where there is hardly any muscular exertion at all. This, being contrary to their habit, produces a certain degree of *uneasiness;* which occasions an attempt to shift their posture;

which being made by the muscles of the back, they are constantly throwing themselves towards the bottom of the bed.*—What has been just said shews, that in sleep there is a great degree of rest from muscular action.—Again, the *Heat* of the body is produced by the action of the *Living Power*. It is very true that almost every body, (excepting Dr. Cullen,) has attributed the heat of the body to some means of producing heat connected with a living body: (It would be a digression greatly too long to enter into at present, to state the arguments on this question here). If the opinion be wrong, that it does depend upon the living power; it will affect the present argument but very little; it being at present only intended to state a fact; to wit, that (although the heat of the body to the thermometer be the same in a man sleeping or awake;) yet when a man is asleep, he cannot communicate so much heat to the surrounding medium, as when he is awake. (This is evident by the experience of every man, who falls asleep with the ordinary clothing which he wears when awake; for on waking again, he feels extremely cold; that is, he feels the substances that surround him, very cold).—Although the *Heart* continues its action when a man is asleep, as well as when he is awake; yet during sleep it happens very often that the pulse (the measure of the action of the heart,) is neither so frequent, so full, nor so strong as when a man is awake.—Moreover, the *Breathing* does not go on so quickly; nor the *Peristaltic Motion* of the intestines in the same degree; nor any of the other actions necessary for life.—Thus, although there is not a total rest in those actions of the body, which must constantly take place in order to its existence; yet the body does not exert itself in the same degree.

In sleep, therefore, the Judgment is often totally at rest; perhaps the Memory [illegible]gination are sometimes also totally at rest; and the power of Perception in the mind is certainly sometimes totally at rest.—The state of the Body, which gives the mind a means of perception, is also in some instances (perhaps in all) totally at rest; the Muscular exertions, *not necessary for life*, are totally at rest, (excepting where habit has made it more easy for certain exertions to take place); and lastly, the muscular powers of the body, which are *necessary for life*, act with less vigor.—*Sleep*, therefore, may be considered as a *state of rest*, during which the powers of the system are *recruited*; or, (to go on with the simile first begun with,) the dam is shut up; so that the waters accumulate in it, and are ready to be applied, to bring the whole of the machine into action.

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* When a patient lies on his back, the upper parts of the body are bent, to suit the inclined plane formed by the bolster and pillow; and among the various accidental motions of the body, those only take effect in this case which carry the body downwards; for none carry it upwards. Hence the body continually descends in the bed, till these causes cease to operate.—When the patient lies on his side, the angle formed by the head and neck with the shoulders, better fits the rise formed by the bolster and pillows; essentially varying this state of things.—To remedy the difficulty in the former case, the feet should have a board or other support, placed on the outside of the bed-clothes; which would serve the patient as a gage for his position; and assist him in regaining his place, should he lose it.

The only apparent *Objection* to this view of sleep is, that people in *Madness*, in many instances, *never sleep*:—But then the author would contend that they are *never awake*. Their judgment, (that which is the greatest exertion of the power of the system,) is never at all exerted in maniacs who never sleep. The imagination may arrange the ideas that the memory presents to it, without the judgment ever attempting to disturb it. The power of perception in their mind is undoubtedly perfectly confused; (a crown of straw or even a single straw, painted on the retina, excites the idea of a crown of gold adorned with jewels; a single straw, the idea of a circle, and not of a line). The power of impressions on the body is much less: it requires several times the dose of a purgative, or of any other medicine, to produce an equivalent effect.—The common stream of power flowing into the body, (if we may so speak,) may be sufficient to keep up such a degree of action as has just been described, constantly; but not the actions which take place in a person whose faculties are sound.

The next thing to be inquired into is the *Effects of sleep*.

Having shewn that the actions of the mind are very considerably at rest in sleep, if not sometimes totally; and that the exertions of the powers of the body are also in a great degree of inaction;—if a quantity of living power be constantly generating in the system, it follows, that in sleep this power will be gradually accumulated; (as the water would be in a dam, if a constant small stream were flowing into it, and only a part of that stream flowing out. The dam being filled, the water flowing over would set some of the parts of the machine at work; which might raise the sluices of the dam, and put the whole of the machine in motion.)---Thus in the system, when a quantity of power is accumulated, part of the exertions may take place; as we see is the case in natural sleep. A man in health, and not much fatigued, first falls into a reverie; and then into sleep; which sleep at the beginning is accompanied with dreams; afterwards becomes more profound, until sometimes it becomes perfect, perhaps without any dream; and the person is with difficulty awaked and excited into action.—After a time of such profound sleep, he begins again to dream; all his powers are brought into action with great facility, if any stimulus be applied: otherwise they come into action and the person awakes, without any stimulus being applied; as it were *from the system being full of power.*

If the subject be viewed in this light, it will appear, that *Sleep* is simply that rest, which is necessary to *recruit* the powers of the body and the mind, when they are exhausted;---(and that in the common and healthy state of the body, when there is the ordinary exertion, sleep is necessary after a certain interval, to restore the powers of the system; so as to enable them to exert themselves.)

Want of sleep, therefore, will *prevent the necessary accumulation of the powers of the body;* and consequently induce weakness, (or the want of sufficient power in the system to exert itself to any great degree.) A *continual* want of sleep, (if the exertions take place, as when a man is awake,) will at last so exhaust the system, as to deprive a man of all power of action whatever; so that he shall no longer exist.

Sometimes *Want of sleep for a certain length* of time produces *Mania;* (a state of the system which is not our business here to inquire into. It may be sufficient to observe, that we cannot pretend to determine *a priori* any thing with regard to what would happen to animals: whence mania is a state of the system that no man could have imagined, if it had never actually taken place.)

Supposing the *System is weakened by the want of sleep,* and that mania does not take place;---we are next to notice what happens, when the weakness is not so great as to destroy the patient.---If any machine be made on mechanical principles so as at once to perform many actions independent of one another; and a force be applied to put that machine in motion, so that it shall perform all its functions; if that force be diminished, some of its functions may cease entirely, and the others go on regularly.---Suppose that we have a time-piece, in which the motion of the parts keeping time, should be produced or continued by a power, which is more than sufficient to produce the motions keeping time. The superfluous power may be employed to occasion another action; such as the pumping of water, to which it is actually applied. The machine in such case might be so constructed, that the primary power should be sufficient to keep up the motion of the time-piece and something more.---But the power also might be diminished so as not to be more than sufficient. In that case it would cease to act upon the pump; so that the motion of the time-keeper might continue, without the motion of the pump.---Or otherwise, a mechanical machine might be so contrived, as that the power originally generating motion should act equally in producing all its motions: in that case, if the original power was diminished, all its motions would be diminished equally. ---*Neither of these is the case in the human body*, when the power which actuates it is diminished for want of sleep or by any other means. Some of its actions *do not cease* while others go on, nor are they all equally diminished; but the whole of its actions become *irregular*. (While some of them diminish, others increase; and this indiscriminately; that is, it is uncertain which will increase and which diminish.)

Want of sleep, therefore, produces irregularity in the *whole actions of the body*, and great irregularity in *fever*.

So does also *any other cause diminishing the powers of the body*; ---but not nearly so much as want of sleep.---For example, if a man in health should be prevented from sleeping *during a whole night*; little more would happen, than that all the powers of the body and mind would be somewhat diminished. He would not be able to make such great exertions in walking and riding; nor would he exert the muscular actions of the interior parts of the body in so great a degree. The powers of his perception, as far as depended on the body, would not be so complete. (For example, he would not be able to adapt his eye so exactly to the distance of an object, as that it should be painted perfectly on the retina: the mind would take less readily or perfectly the impression from the object painted on the retina; the memory would be less ready in bringing up ideas to the imagination; the imagination would be less ready to arrange them; and the judgment would be much less exerted in determining the justness of that arrangement.)---So far the system would be affected pretty nearly in the same manner as a mechanical machine which had lost part of its power.—Let the same man be *prevented from sleeping a second night,* then irregularity would begin to occur through the system. A strong contraction would take place in some of the muscular fibres of the intestines; the appetite would begin to be lost; the muscles in the exterior parts of the body would some of them act more strongly, others more weakly; the heart would sometimes contract more frequently, sometimes (although seldom) more slowly; the powers of perception, as far as depended on the body, would some of them be stronger for a short time, and soon after in the same organ weaker. The same thing would happen in the power of perception, as far as it depended on the mind: memory would sometimes bring up ideas very fast, and sometimes very slowly; the imagination would sometimes arrange ideas very readily, but not very often in the order which the judgment would approve; and the judgment in many cases would not be exerted at all, but leave the fancy to arrange them just as it pleased.—And if a man in health *continued to be prevented from sleeping;* these derangements would go on; and *mania* would often be produced.

On the other hand, if such derangements as have been described should take place from any *other* cause in a man in health, sleep would also be prevented.—In fever (as in many other diseases), *these disorders* in the system prevent sleep in a much greater degree;—and want of sleep produces *them* again in a much greater degree; only instead of mania, *delirium* takes place.—While the disorders in the system which take place in fevers, prevent sleep; the want of sleep in fevers, weakens the *whole system,* produces the disorders which have been enumerated, and occasions delirium.

To return from this Digression.

If a continued fever is produced—sometimes when the *cause of the disease is applied,* there is not the least appearance of fever, or any apparent alteration from health, *for many days;* until all at once a complete paroxysm of fever comes on.- Sometimes, when the cause of fever is first applied; some *slight* febrile appearances take place, which continue till a perfect attack of fever arises; which comes on at once, and its first paroxysm is easily ascertained: although now and then they gradually diminish and go off, without any permanent fever arising.—When such slighter febrile symptoms take place, they do not increase gradually, so as to constitute a fever; but the patient goes on with his ordinary occupations: not well indeed, but not so as to be confined; until at once a paroxysm (such as has been described in the dissertation on the ephemera simplex) takes place; so that the patient can almost always mark the very hour in which the attack comes on.—Sometimes a *complete* paroxysm of fever is produced *immediately* on application of the cause.

If none of the symptoms of fever happen between the time of the application of the cause and that of the first paroxysm, a strong attack takes place at once; and begins often with a sense of coldness, horror, and rigor; the cold is followed by a sensation of heat, which is succeeded again by a sense of coldness; and so alternately, for the first twenty four hours.---Sometimes there is no sense of coldness, but the patient feels from the beginning very hot.---Whether there be a sense of coldness or a sense of heat, the thermometer under the tongue rises to about one hundred, or from that to one hundred and five degrees of Fahrenheit's scale; (excepting at the very first beginning of the attack).---Whether there be sense of cold or of heat, there is always great depression of strength, both in the powers of the body and the mind; which is generally according to the degree of fever; and is sometimes so great, as to render the patient unable to support himself in an erect posture; but sometimes not so considerable as to prevent him from doing his ordinary business, if he makes extraordinary exertions.---It has often happened, that physicians have been too apt to go on without attending their patients for a day or two *after a paroxysm has actually taken place*; who have been by that means so exhausted, as not to be able to go through the remaining part of the disease; but have been cut off.---The depression of strength is, in all degrees, between the above named extremes.---The pulse, during the first twenty four hours, beats seldom less than ninety times in a minute; and very seldom more than one hundred and five; (whereas in an *ephemera*, or in the first paroxysm of an *intermittent*, it very often rises to one hundred and twenty or thirty pulsations). It is sometimes full and strong; always obstructed; sometimes small and particularly soft; sometimes of the *natural fulness, but with a particular degree of softness*; (when this is the case, it indicates a fever which will be *very violent*, especially as to *depression of strength*).

The author wishes in this place to explain his terms as to strength, hardness, softness, obstruction, or freedom of the *Pulse*.

Great numbers of practitioners have called *Obstruction*, hardness; *Freedom*, softness of the pulse.

The feelings of the organs of the senses are often different in different men. The ear, for example, of one person, can distinguish accurately the different notes on the musical scale; the ear of another can distinguish nothing but that the sound is louder or less loud. In like manner, the fingers of some are only capable of distinguishing whether the pulse is more or less frequent; and that, by comparing it with some other measure of time.—It is necessary, therefore, that we should have some other criterion of the differences of pulsation, than the feel of the practitioner; in order to teach young practitioners how to discover if they have any power of feeling different sensations, and distinguishing them.

When the pulse is *hard*, (whether it be strong or not,) the blood is *long* in coagulating: (the consequence of which is, that if the blood flow from a vein in a large stream through the *air*, into a vessel nearly the section of a sphere; the red particles will fall down towards the bottom of the blood, and leave the *upper* surface of the coagulum *colorless* after the blood has coagulated). Whereas if the pulse be *Strong without any hardness;* the blood will coagulate *much sooner* under the same circumstances; so as *not to give time* for the red particles to fall down from the *upper* surface of the coagulum, which will therefore remain red.—In like manner, if the pulse be *Obstructed, and not hard;* the coagulum will be red on the *upper* surface.—This then is a criterion by which both strength and obstruction may be distinguished from hardness; (viz. when the pulse is hard, the *upper* surface of the coagulum is not red,)

It is necessary that the practitioner should make himself master of the *feel of the pulsation* under these different circumstances.---This may be done by feeling the pulse of a patient affected with an intermittent; in which there is often strength, fulness, and obstruction; but no hardness: and in *this case* a quantity of blood may be taken away without any detriment to the patient.---And the same again happens in a *pleurisy;* where there is strength and hardness; and where blood is taken away with great propriety.---By these means any man with the faculty of feeling, (sufficient to distinguish the different sensations arising from pulsations,) may make himself exposed to the *causes* of fever much oftener in the day time, than during the night; when the attack follows the cause *immediately*.---When some *slight symptoms* only of the disease take place at the time of the application of the causes, and when no appearances occur for *many days* after the application of the first cause; if in either of these cases the *first* paroxysm begins between six in the morning and eight in the evening, the author has nothing to offer to account for this phenomenon. That it is a fact he is well assured, from the observation he has made for many years in the cases of a great many patients.

If it be true that a *continued* fever is only a set of paroxysms of fever *running into one another*; it becomes a question how long these paroxysms last; and what is the cause of their return.---In the first place, so far as the author's observation has gone, the first paroxysm of continued fever lasts, if it begins at six in the morning or at any other hour before eight in the evening, until five and six in the evening of the following civil day: (that is, if it should happen at any time between six o'clock in the morning and eight o'clock in the evening, the second exacerbation will begin at six o'clock nearly of the subsequent civil day.)---But if the first paroxysm should take place between eight o'clock in the evening and five o'clock in the morning; then the second exacerbation will take place in the evening of the subsequent day, if it should be before midnight; and on the same day, if it should be after midnight. (In other words, supposing that the first paroxysm of fever should take place at six o'clock on Sunday morning, or at any time between that and six o'clock on Monday morning; the second paroxysm will take place between five and six on Monday evening.)

The next thing to be attended to, is the *Reason* why this second exacerbation (or new paroxysm of fever,) should take place between five and six o'clock in the evening.---It has been before remarked, that *all men*, even in the most perfect health, have a feverish attack *in the evening*, which goes off in the morning. (In a man in perfect health this attack, although not much marked, is yet sufficiently sensible.)---In the first place, there is a depression of strength, both in the body and the mind, sufficiently evident. There is not the same alacrity of mind, in the evening; nor power of memory, imagination and judgment, as there is in the morning.---This proposition has been controverted by poets and philosophers, who have often praised *midnight study*. Two things might be objected to them; first, they are not willing to give up their connections with the world for the sake of study; and therefore defer it until every body else is at rest. Secondly, there is that indolence in mankind, (especially in those who consider speculation as their supreme happiness,) which makes them wish to defer every thing to the last moment.---It is easy, however, to refer the fact to the feeling, or in other words, to the experience of all mankind. The alacrity of the mind in the morning, and its dulness in the evening; have the one been celebrated by poets and philosophers, and the other reprobated. The muscular power of the body is likewise greater in the morning: laborers, whatever may be their habits, universally get up in the morning to their work, and go soon to bed: hunters rise early in pursuit of their game in every situation; even where the scent of the game lies no better on the ground, (as where a wood is enclosed, in which it is equal at any time of the twenty four hours).---Some of the appearances which constitute part of fever, (such as the contraction of the small vessels,) are evidently much greater in the evening. The complexion of a woman is pale in the evening, that was rosy in the morning.---If in perfect health this natural evening paroxysm of fever is visible; it is infinitely more so in *diseases* of most kinds, there being none in which it has not been observed by practitioners; (so much so, that it is not necessary for any further illustration of it be laid down here).

The cause of this natural evening paroxysm of fever has not as yet been investigated.—It cannot depend upon the sun, for it happens at a time of day when he is at no particular meridian: much less can it depend upon the moon, it being fixed to a particular time in the evening, whereas her appearance is perfectly mutable.---It might be supposed to depend upon the fatigue of the day: but it happens equally to the laborer who goes to the plough at four o'clock in the morning, and to bed at eight in the evening; and to a woman who goes to bed at four in the morning, and rises at two in the afternoon.---It may be said, that it depends on habit; as infants until they come to a certain age, are put to bed early in the evening; and rise early in the morning. This reason is refuted by the following circumstance: the sun rises at different times at different parts of the earth: so that it is morning at one part of the earth, when in another it is evening. If a man, brought up in one part of the earth where it is morning, when it is evening in another part; should pass from his native country to the country in which his former morning is evening; if it were habit, the natural evening paroxysm of fever ought to take place in him in the morning: but the fact is, that it takes place in the evening, in the same manner as in the natives of that country.---No method has, therefore, hitherto been found out, to account for this appearance.

Whatever be the cause of the *return of a paroxysm of fever in the evening*, even in health, it is evident that this propensity is the cause of the return of the *second* paroxysm in a continued fever.

It has been said, that if a fever takes place any time between five and six o'clock in the morning of one civil day, and five and six in the morning of the second day: the second paroxysm takes place between five and six o'clock in the evening of the second day.---It sometimes happens, however, that no second paroxysm takes place between five and six in the evening of the second day; in this case, the fever wears off, and is an ephemera. Such cases, however, rarely happen: but the author has had occasion to observe them four or five times in his practice.---As far as can be judged, therefore, it is the disposition to *natural* evening paroxysm of fever, that reproduces the paroxysms of *continued* fevers.

The causes then which reproduce fever are *apparently two*:---*one* that reproduces a remittent and intermittent fever at the expiration of a certain period of time; the *other* the natural evening paroxysm, which reproduces a continued fever;---both of which, as far as the science of medicine has hitherto been investigated, are perfectly incomprehensible.

It is to be remarked however in the *first* place, that these different causes serve to *distinguish* between an intermittent and remittent on one hand; and a continued fever on the other hand.---For if we find, in the first days of a fever, when there is no perfect intermission; that the exacerbation takes place between five and six o'clock in the evening, or a little later: we may conclude, that the disease is a *continued* fever;—but if the exacerbations take place at any other time in the twenty four hours, that it will terminate in an *intermittent or remittent* fever.

The *next* circumstance that depends upon this doctrine, is the *the time of the beginning of. a continued fever.*

There has been much said about the *days of a fever.*---It is clearly impossible to determine its day, unless we can tell on what day the fever *began.*---If, in continued fever, the *second* exacerbation always takes place between five and six o'clock in the evening; then the third paroxysm, and the fourth, fifth, &c. also begin between five and six o'clock in the evening. The first must be *conceived* to begin between five and six o'clock in the evening, whatever time it really took place; according to the rule already laid down,* (by which it has been shewn at what time the second paroxysm actually takes place; the first being considered as beginning *twenty four hours* sooner).

It has been already said, that the *first* paroxysm of a continued fever is irregular; with a greater or less degree of violence; (seldom, however, so violent as the subsequent paroxysm).—The *second* paroxysm is generally regular. It rarely begins with a sense of coldness; the head-ach is considerably increased; the pulse is from ninety strokes in a minute to an hundred and ten; (seldom more frequent, excepting when the disease is to be an irregular continued fever, which is to be the subject of a future dissertation;) it is always obstructed, not often hard; when it is hard, this likewise indicates irregular fever, (which will also be the subject of a future dissertation); lastly, it is of different degrees of fulness and strength. ---Depression of strength is undoubtedly an universal and constant symptom of fever; and therefore cannot be considered as an irregularity: the degree, however, of depression of strength, is very various: and when it is very great, the pulse has a very peculiar feel of softness.---The heat taken by the thermometer under the tongue, is from ninety nine to one hundred and five of Fahrenheit's thermometer: (to the feel of the patient it is generally greater, and sometimes excessive; and to another person, always more or less pungent).---The appetite is likewise lost to a greater or less degree, according to the violence of the disease: often totally.---There is always some degree of nausea; often sickness; and sometimes vomiting. Thirst is sometimes very great; but sometimes inconsiderable, or hardly felt. The evacuations are generally suppressed: the patient is costive: the skin is dry: the urine is in small quantity; and after standing some time, continues transparent: the mouth is dry.---The mind is always more or less confused: sometimes, even so early as in the second paroxysm, the patient is delirious during the whole night: sometimes again the sleep is only confused with dreams.---The tongue, (which in the first paroxysm was only covered all over with a very thin whitish crust,) is now generally become browner: if the fever is more severe, this crust is thicker; and when the depression of strength is great, it is clammy.---There is a sense of weight about the precordia;---likewise a sense of depression and anxiety.

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*See this still more plainly stated at p. 224.

The author has *hesitated* much, whether he should consider a fever, in which the *strength is very much depressed, as an irregular fever*. After mature deliberation, however, he can hardly allow himself to distinguish it as such.---It is true, Sir John Pringle and many other practitioners, (being attracted by the appearance of putrefaction which takes place in fevers where the strength is *greatly* depressed) have supposed that the disease depends *on putrefaction of the fluids*; and not the putrefaction of the fluids upon the disease. If the putrefaction of the fluids is subsequent to the depression of strength, and if a certain degree of depression of strength takes place in all fevers; in that case certainly the putrefaction of the fluids cannot be considered either as the effect of putrefaction, or as an accident happening in fevers.---This argument will soon be more fully entered into.

It is therefore only to be remarked now, that *according to the degree of depression of strength*, a greater or less weight is felt about the *precordia*:---sometimes depression of the mind (as if some great misfortune had happened to the patient, which he cannot describe,) and involuntary sighs arise from his breast.---The degree of depression of strength generally determines the wish to be in bed; where, (as has already been observed,) the muscles have the least exertion. When it is not very great however, and when the patient naturally is spirited; he wishes to get up in the day time: but is generally forced to lie down several times in the course of the day.---The skin appears of a dusky, dingy color; (the ground of which has been already explained in a former dissertation.)---There is pain in the forehead, immediately over the eyes; which feels to the patient in the skin, or immediately beneath it. This pain is sometimes slight, sometimes very severe; sometimes reaches all round the head: but is always external, to the feel of the patient.---

Sometimes there is depression of strength only in the extremeties, and a feel of weariness.---At other times there is a feel of soreness, as if the patient had been beat all over; or such as arises after a very strong contraction of any muscle. (This last symptom takes place only when the fever is very severe.)

All these appearances come on, or are increased, between *five and six o'clock in the evening*; then increase gradually; and are at their greatest height about two or three o'clock in the morning.

Afterwards, in slighter cases, the patient has some tolerable sleep. It is a very severe fever indeed in which he has none; though even then he is less restless: but he is relieved in a greater or less degree from all the symptoms about *five or six o'clock in the morning*.---Although all the appearances that have been enumerated, remain; yet they remain with less severity than they possessed about two o'clock in the morning.

The *third paroxysm* is more severe than the second;---and so, every evening; the disease continuing to increase for the first week.

The author has already ventured to hint an opinion, that the *putrefaction of the fluids*, which sometimes take place in fever, is the *consequence* of the depression of strength, and *not the cause* of it.---The contrary opinion has been held by Sir John Pringle, and many other of the first authorities in medicine;---and therefore requires very particular attention.

It has pleased the Almighty, that animals and vegetables should be continued by succession. (The present race of both die; some in a shorter, some in a longer period of time; but all die at last, and are succeeded by their progeny; each species producing successors perfectly, or nearly, similar in properties to itself.)---When one race dies, it is evident that some means should be adapted to destroy the matter of which it consisted. (A new race of vegetables would have no room on the earth, if the old vegetables remained exactly in the same situation in which they died: a tree would soon be buried in its own leaves. Even animals would soon cover the whole face of the earth; so as not to give room to new animals, without constantly treading over the bodies of their ancestors: The sea would become one mass of dead fish.---The all wise Creator of all beings has, therefore, found means, with perfect facility, to get rid of this, as well as every other difficulty, that the small degree of discernment of mankind has been able to perceive in the creation.

There are *two modes* in which this is performed, as far as the subject has been investigated.---One is by creating many *insects and reptiles*, which live upon dead matter. These are much more numerous in the warmer regions of the earth: where both vegetation and the growth of animals go on with greater rapidity. (How soon do the termites ants destroy, in a warm climate, all dead vegetable matter!)---The other mode is, by making animal and vegetable substances subject to processes, which are called *fermentations*; (the ground of which the author has endeavored to set forth in his Treatise on Digestion;) which fermentations terminate in putrefaction. (It would be improper here to say any thing further of this process; than that it converts all animal and vegetable matter partly into certain salts; and into vapors in a small proportion; but principally into earth and water.)

It has been observed, in *recounting the causes of fever*, that one cause was, the *vapor* arising from putrefying substances.---If to *Dead* animal matter, a putrefying substance or vapor arising from a putrefying substance be applied; putrefaction will take place in it much *more readily*, than in a dead animal or vegetable substance to which no such putrefying substance or vapor has been applied.---A question therefore arises, whether a putrefying substance, or the vapor arising from a putrefying substance, applied to *Living* animal matter; will produce putrefaction sooner, than if no such substance or vapor were applied.

It has been already shewn, that it is necessary that dead animal and vegetable substances should be destroyed; and it has also been said, that it has pleased the Almighty, that all living animals and vegetables should die.---The *manner* in which all living animal and vegetable substances *are to die*, and so to be lost; is very different however from the mode in which animal and vegetable matter, *when dead*, *is to be destroyed*.---A living animal, or vegetable, is produced by its parent, weak at first, and imperfect. It acquires perfection by degrees; until it becomes capable of all the purposes for which it is destined.---Among these purposes, one is, to be capable of propagating its species; and for this, after some time, it has less and less power. At last its faculties begin to decay, and do gradually decay, until the whole of them are lost; and the animal or vegetable dies. (In man this progress is more marked than in any other part of the creation.)---In this manner, man is to live through his life, and then to die.---But during his life he is *not* subject to the laws of *dead* animal and vegetable matter; and among these, therefore, *not subject to putrefaction*.

If a man, when alive, were subject to the laws of putrefaction; why should he be placed in every situation in which putrefaction most readily takes place?

Putrefaction takes place *most readily in a Heat* of 100° of Fahrenheit's thermometer. (It goes on much more slowly in a heat of 110°; hardly at all in animal substances in the heat of 150°. It goes on more slowly in *less* degrees of heat than 100°; and scarcely at all in 40° of Fahrenheit's thermometer.) The heat of the human body in health and vigor, is generally 97° and an half of Fahrenheit's thermometer. It varies in disease; sometimes from 92° to 107°.---It is always therefore, both in health and disease, near the most proper heat for putrefaction;---Yet no appearances of putrefaction take place in the blood, nor in any part which is *alive; excepting* in fever and sea scurvy.

Another circumstance which forwards putrefaction is *exposure to pure air*.---If an animal substance, the moment it dies, is perfectly *excluded from* pure air; it will not putrefy. On the other hand, if a *great blast* of pure air be constantly applied to it; it will putrefy much more slowly, than if a moderate quantity be applied.---The application of a *moderate* quantity, therefore, is the best means of producing putrefaction; and a moderate quantity of pure air is actually applied to the matter of the body of a living man.---The *vapors* constituting the atmosphere contain a fourth part of pure air; and are applied only to the surfaces of the body, (that is, to the skin, and to the surface of the nostrils, mouth, and lungs,) which form a very small part of the solids: and the *pure air* of the atmosphere has a moderate effect on the blood passing through the lungs: (for that it does affect it in a certain degree, appears from its giving a *yellow* color to the red blood; so as to *render it scarlet*.)---As far, therefore, as application of *air* tends to produce putrefaction; the human body is in that situation, in which putrefaction would most readily take place.

Another circumstance under which the putrefactive fermentation takes place more readily, is *motion*. In the human body the fluids are in constant and very rapid motion. The heart contracts seventy three times in a minute; and it has been supposed, (as near as can be measured,) that it sends out at each contraction two ounces of blood in a minute. Supposing then that the blood is in the largest quantity that *has ever been stated*, to wit, sixty pounds; [the equivalent of] the whole of it will be circulated through all the canals in the body, and return to the heart, in six minutes.---To give a more distinct idea of the velocity with which the blood moves in the veins; (where it moves with the least velocity,) let a man compress a vein on the back of his hand at some distance from the valve immediately above; and squeeze out the blood up to the next valve; so that the vein shall disappear: then let him immediately remove the pressure, he will find the vein fill again faster than his eye can trace.---The blood, therefore, has always constant and rapid motion.

It is evident, therefore, that the matter of the living human body is always in circumstances, in which dead animal matter would putrefy most readily.

It has been *alleged*, that certain *salts or other matters*, contained in the blood and other parts of a living man, prevent the other matter in his body from purtrefying;—or that the putrescent matters are *carried off and fresh matter introduced;* so as to prevent putrefaction from taking place.---Those who have advanced the *former part* of this doctrine have forgotten, that if the body of a *dead man* is left in the heat of ninety seven and a half degrees of Fahrenheit's thermometer, *without motion and application of the air to the blood* or the lungs; (although the same salts, or other substances remain exactly;) putrefaction takes place in twenty four hours in a very violent degree.---Against the opinion of some authors, that matter is constantly *carried off and new matter* introduced, and by that means the putrefaction prevented; the following argument is sufficient. It is well known that a man may *live* under all the necessary and most powerful circumstances of putrefaction, *without any thing being taken in for twenty four hours, or evacuated* (excepting the water that flies off by insensible perspiration); yet there is not the smallest appearance of putrefaction in the body. If, however, a man had been destroyed *instantly*, when in perfect health, by some accident, (such as a wound in the spinal marrow, between the first and second vertebra of the neck); putrefaction would take place in twenty four hours, if the *temperature of the dead body was confined to ninety seven degrees and an half* of Fahrenheit's thermometer; although it was not assisted by exposure to the air in respiration, or by motion.---Since, therefore, it is known, that although the body of a living man be in every situation most proper for putrefaction, and nothing is applied which would prevent the same body (if it was dead) from putrefying; nevertheless the body of a living man has no appearance of putrefaction: it necessarily follows that there is *in the Life*, (independent of all other circumstances,) a power of preventing putrefaction.—(In *other words*, it is the property of living matter to remain untainted by putrefaction; and the property of dead animal and vegetable matter to putrefy.)

Mankind, ever inquisitive, (from the disposition which the Almighty has chosen to place in their minds,) are constantly endeavoring to find *Reasons for every effect according to something they are already acquainted with.*—In this particular case, they have supposed that the operations which take place in living animal matter, should agree chemically with operations that they can perform in dead animal matter. They have, therefore, concluded; that since animal matter, *when alive*, is prevented from putrefying in certain circumstances, in which it would have putrefied very readily when dead; this must be occasioned by means which would have prevented *dead* animal matter from putrefying, if it had been in the same circumstances.—No such means, however, has been shewn to be applied to living animal matter.—But was it not as easy for the Almighty to make a law, that living animal matter should *not* putrefy; and that dead animal matter *should* putrefy: as to make a law that if one mass of matter be placed at a distance from another mass, the two should immediately (if not prevented by some cause) begin to approach each other?---The author by no means wishes it to be understood, that it is unnecessary to inquire, *whether it be or be not so;* for that must be investigated by experiments and observations.---He has merely shewn that every circumstance which would make putrefaction take place in the dead body of a man, is constantly applied in the living body; and that no *chemical* circumstance has been discovered in the body of a *living* man, to prevent such putrefaction from taking place.---He therefore concludes, that it is an *Original Law* given by the Creator, that living matter should not putrefy; and that animal or vegetable matter, when dead, should putrefy and be destroyed.

The *Heat* of living animal and vegetable substances will admit of a parity of reasoning;—but this is foreign to the present subject.

Thus far the author has inquired, whether the human body, when *alive:* has a power of resisting putrefaction when exposed to all the circumstances which promote putrefaction in a *dead* human body.

The point that the author set out with was, whether putrescent matter applied to the body, produced fever; and in that fever, the depression of strength, which occasioned putrefaction:---Or if the putrid matter applied to the body occasioned putrefaction of the fluids, (as a ferment or otherwise;) *after which* putrefaction brought on a depression of strength.

Many people are constantly exposed to putrid matter, both in a solid and fluid state; as also to the vapors arising from putrid substances; and yet no putrefaction, or any appearance of putrefaction, is found in their blood. (Those, for example, who are employed in cleaning out putrid ditches, or the common sewers of great towns; have neither in their blood, nor in any other part of their body, any discoverable appearance of putrefaction.)—When therefore *no fever* is produced, nor depression of strength as part of that fever; it is evident that putrid matter does not occasion any appearance of putrefaction.---*Even when a fever is produced* by putrid vapor or any other cause, if fever exist in a great degree, and there is great depression of strength at the first; yet for several days there is no appearance whatever of any putrefaction in the fluids. Blood taken from the arm coagulates firmly; the tongue is covered with a whitish crust; there is no putrid smell in the air coming from the lungs, or in any of the evacuations; there are no marks upon the skin; there is no appearance of putrefaction in short in any part of the body: but, besides the great feel of depression of bodily strength, there is great depression of spirits, and sense of weight about the precordia; with a peculiar imbecility in the pulse.

As therefore *the depression of strength takes place first*, and the putrefaction afterwards, according to the usual precedence of cause and effect, (to wit, that the effect follows the cause,) it seems to be sufficiently proved, that depression of strength is the cause of the putrefaction; and not the putrefaction the cause of the depression of strength.

In *Sea Scurvy* (as it is called) the putrefaction of the fluids arises undoubtedly from animal food being used, without a sufficient quantity of vegetables of a loose texture; (to prevent it from entering in part into the putrefactive fermentation, during the digestion). This happens especially when the animal food is preserved by salt.---In such cases a chyle is thrown into the blood vessels loaded with putrescent matter.---In this disease, the *first symptoms* which take place are always languor and depression of strength; and inability of exerting the muscular powers: *Afterwards* symptoms of putrefaction come on.---This shews that *even in this case* it is the depression of strength that occasions the putrefaction.

Since, therefore, the solids and fluids of a living man are placed in situations the most proper for putrefaction;---since there is nothing applied to the living body to prevent putrefaction, which is not also applied to the dead body, when it putrefies very fast;---since no fresh matter is added to the living body during the time which the dead body (placed in the same circumstances) would putrefy;---since the depression of strength takes place always in a fever *before* there be any appearances of putrefaction;—and lastly, since when the *blood* is rendered putrid by putrescent matter being thrown into it, depression of strength always takes place before there be any *appearance* of putrefaction:---It may be concluded, that the *depression of strength is the cause of the putrefaction of the fluids in fever;*---and not the putrefaction of the fluids the cause of the depression of strength.

Symptoms of Putrefaction rarely appear in the *second* paroxysm of a continued fever; and seldom in the *third* paroxysm (or third day of the disease;) counting as has been already laid down.

The *Symptoms of Putrefaction,* when they first take place, are alterations in the appearance of the secretions.---The urine first has a more viscid appearance than common: is frothy, browner, and not absolutely transparent; (although there is no cloud or sediment.) If the putrefaction is still greater; it becomes of a dark brown, and loses its transparency; and sometimes a dark brown sediment falls to the bottom of the vessel, after it has stood an hour or two.---The feces begin to be fetid; and at last have a very putrid fetor; (which, however, is to be distinguished from the fetor of the inflammable air which is often discharged and is very fetid, although there be no putrefaction.) The feces are also not uncommonly black and liquid.---The sweat, if there should be any, tinges the linen with a dilute ichorous appearance.---The crust which forms upon the tongue, appears browner and more clammy; and as the fever goes on, it grows browner and browner, until at last it is quite *black*.---The teeth (rubbing the crust off from the tongue) become as it were buried in a black slime: (this hardly takes place before the end of the first week of the disease.—The breath also becomes fetid.—There sometimes appears upon the skin, (unless the putrefaction has arisen to a considerable degree,) a kind of discoloration: similar to the appearances called blood veins in polished marble not purely white. When the degree of putrefaction is more considerable: dark *purple* spots, of various sizes, are formed in the skin: If the putrefaction be still more considerable: the skin becomes all over of a dark purple color.

At the beginning, when the putrefaction has not gone to any great length: if blood should happen to have been taken from the arm, the coagulum is loose and easily broken: the serum being hardly of a browner color than common. Sometimes when the depression of strength is not very great, the blood retains this appearance during the whole course of the disease. Should the patient become so weak, as to be carried off by the weakness: this appearance is not altered: for it is depression of strength, not weakness, which produces putrefaction.—If there is greater *depression* of strength, (and by consequence putrefaction is in a greater degree,) the *Serum* becomes of a browner color. In a still further degree, it is *red*. (In this case, on examining the red particles with a microscope, many of them are found diminished in size, and not regular spheres or oblate spheroids: some have even the appearance of being broken in two, and look like half moons: but *most* of them retain their healthy appearance.)—If the putrefaction goes on still further, there is hardly any distinction between serum and coagulum.---If still further, the *Coagulable Lymph* forms a kind of *bag*: leaving the serum on the outside, distinct. In the substance of the bag itself there is no intermixture of red particles: so that it looks like the buff which is on the surface of the coagulum in cases of general inflammation: But *within* this bag a red fluid is contained; which (upon being examined with a microscope) shews the red particles under a variety of forms.---All these appearances the author has seen. ---There are some cases upon record in which it is stated, that the blood was absolutely *fetid*: and a practitioner of perfect credit, (who practiced a considerable time in hot climates,) told me he had seen *several* cases, where the blood taken from the arm was thus actually fetid.

As *depression of strength produces putrefaction of the fluids*; so, on the other hand, putrefaction of the fluids occasions *greater depression of strength*: sometimes in a degree that proves fatal.---In this case, the *Pulse* often towards the end beats faster than can be counted.---It happens more frequently that *Hemorrhage* arises (almost indiscriminately) from any of the cavities which open externally. These hemorrhages are very dangerous, and often fatal.

Depression of strength happens in a greater or less degree in all fevers. In many, it does not happen in such a degree as to produce any sensible appearance of putrefaction of the blood: yet as the cases in which it does produce putrefaction of the blood, and those in which it does not produce any appearance of it, only differ in degree; it can never form an *irregularity* of fever.---It can only give rise to a *variety*, which does not at all affect the practice; (as will be afterwards shewn).

At particular *times*, it is very rare that any great *mark of putrefaction* takes place: at other times, it is more frequent.---It was common enough in London from 1750, to 1765; from that time the severer symptoms of putrefaction have been seldomer seen; and from 1775 to this period (1797,) they have been very rarely seen indeed in fevers.*

Among the symptoms of the disease, which gradually increase from the second exacerbation to the end of the first week, or sometimes a little longer; is *Delirium;* which will likewise require a more minute investigation.

In the first place it is necessary to *distinguish* between two derangements of the mind; *delirium and mania.*---The common distinction has been, that delirium is derangement of the mind, *with fever;* and mania, *without fever.*---Those who have given this distinction, have by no means that idea of fever which the author has endeavored to illustrate. If they mean by Fever, frequency of the pulse; mania undoubtedly exists very often with frequency of the pulse.

It is rare for a person affected with *Mania* to be seized with fever:—It is also very rare for a person in a fever (such as the author is endeavoring to describe,) to be seized with mania.

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* That is, from 1750 to 1765, putrid signs were common; thence to 1775 less common; thence to 1797 very rare.—Did the air, treatment, modes living, or causes of the disease vary, to occasion this?

Mania is that derangement of the mind in which, although the material parts of the *organs of sensation are in perfect order*; yet the mind often takes *wrong ideas* from them. Although a wind mill be painted on the retina; the figure represented to the mind is that of a giant.---In Delirium, the impression made on the organs of the senses is always *imperfect*, as far as the material part is concerned: (the eye, for example, is incapable of *adjusting itself* so as to form a distinct image on the retina, which can be perceived by the mind; but as far as it can be perceived it is always true). A man in a delirium never takes one object for another: he has only an *obscure sensation*, from which he endeavors to take some idea. Having no accurate idea impressed by the organs of the senses, nor brought up by memory; he has nothing in his mind but complete confusion.---But a man in Mania, (supposing the ideas taken from his senses and brought back by his memory, were true,) has his *imagination* such, as often to *arrange* his ideas perfectly; and his judgment is sometimes clear in determining whether the arrangement is just.---In Mania, agreeable objects frequently occupy the mind; in Delirium, hardly ever. (The patient is wandering among tombs, falling over precipices, deserted by his friends, or perpetually in some other misfortune.)---Delirium takes place in many diseases in which there is *no fever*.

In fever, *Delirium* may arise from the fever *itself*; or from certain *Accidents* which take place in irregular fevers.---Delirium which takes place from fever itself, is at present to be enquired into.

When delirium has taken place from *fever itself*; it has been generally believed that it arose from an *Inflammation* of the brain.---There are indeed some cases recorded; in which it has been said, that upon opening the heads of patients who have died of delirium from fever, a *suppuration* of the brain has been found: Hence it has been concluded, that delirium in fever has always been owing to inflammation of the brain.---The author has caused the heads of many patients, who have died with very great delirium in fever, to be opened; and *never* found any marks of suppuration. Most commonly, the brain appeared exactly as it is commonly found; sometimes the blood vessels were distended with blood; but never was any suppuration found: generally no uncommon appearance at all.---Among the numerous dissections which are made in the anatomical schools, many are made of those who have died of fevers; yet it is very rare for any thing like Suppuration in the brain to be seen.

It has just been said, that delirium may arise from *Accidents*, which take place in fevers: Such deliriums will be treated of in that dissertation, in which the irregularities which arise in continued fevers will be described.

Delirium arising from *the fever itself will only here be treated of.*

Delirium, arising from the *fever itself*, appears to be of *Two Species*.---*One*, in the first place, in which, *neither* in the body while it is alive, nor by dissection in the dead body; *can any mark of alteration in the material part* of the brain be found.---In the *other* species of delirium, we might have some suspicion (even during the life time,) that the material part of the brain was altered; and some *alteration of the material part is actually found* upon dissection after the death of the patient.

In that species of delirium, in which there is *no mark of affection of the material part of the brain* during the life of the patient, or on dissection after his death; is it to be assumed, that the material part of the brain *is* actually affected?

Is it to be *taken for granted* also, that the *Mind* exists in the *Brain*; and governs the body, (seated as on a throne; sending its messengers to the other parts of its dominions)?---It may be necessary to consider the question.

The Structure of the Brain is very grossly and imperfectly known; but its *ordinary* appearances have been so well described by anatomists that it is by no means necessary to enter into particulars here. ---Suffice it to say, that in the human brain there are *two laminæ*; one of a whiter color, one of a browner grey, laid upon one another; and puckered up (as well as could be) in the cavity of the scull. The whole is covered on the outside with *membranes*; which touch and adhere to the scull on the outside; and touch each other on the inside, but do not adhere; (so that fluids now and then get between them.) From the *white* part arises a number of fibres, (which run to every part of the body,) which we call *Nerves*.

When the *nerves are cut through*; the mind loses its *power of producing muscular contraction*. From *Anatomy* this is the only reason to suppose, that the mind is situated in the brain; and that it can be deranged by a derangement of the material part of the brain.---Again, certain alterations of the material part of the brain undoubtedly derange the *Mind*. A man whose scull is fractured, is generally (in consequence of mischief to the brain) rendered delirious. An inflammation of the brain in many cases produces delirium; (not in all.) This might lead to a belief, that the mind resides in the brain.---On the other hand, the nerves going to a part, may be *totally cut through* in the human body; yet motion in that part may remain: It may live long afterwards, may regain its sensibility, and in consequence affect the mind; even although the nerves were not again reunited. (This was the case in Mr. Hewson, who in dissecting, cut the nerve going to one of his fingers; and after some time recovered perfect sensation and use of it, although the nerve never reunited.*)---Injuries done to *other* parts of the body produce delirium; when there is not the smallest appearance upon dissection, of injury done to the brain. (Inflammation of the diaphragm produces delirium and death; when on dissection there is no apparent alteration of the brain.)--The brain may also be very much altered, almost entirely converted into pus; without delirium. (Of this instances have appeared in Dr. Hunter's dissecting room. In one of these, it was well known, that there was no derangement of the mind during the inflammation or suppuration; but the patient was carried off by a disease, in which the brain could hardly be conceived to have its material part at all disordered.)---So far there may be very considerable doubt, whether Delirium always arises from disorder of the material part of the brain.---Again, if we refer to our *feelings*; we undoubtedly feel as if the memory, imagination, and judgment were in the head. The *sensations*, however, are generally referred to the part of the body to which the application is made: (thus we feel pain in the finger when it is pricked with a needle:) and the *passions* are always referred to the breast (as common language shows.)---Lastly, the author has in several cases seen, that a delirious patient in fever, (without any abatement of other symptoms) has become perfectly sensible. In all such cases death has followed shortly; (that is, in less than twenty four hours;) as if the mind had escaped from disease of the body, before it had left the body entirely.---All these considerations induce a suspicion in the author, whether delirium may not arise in fever, as an affection of the *Mind only;* (independent of any affection of the material part of the body).

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* Sometimes nerves reunite; and sometimes an auxiliary nerve, or else an anastomosis, may act by way of substitute. There are nerves also of motion, and nerves for other purposes, which must not be confounded.

Another kind of delirium takes place from the *fever itself;* and the patient dies in consequence of the delirium; (at least when the delirium is very severe).---In this kind, *on dissection;* the author has found the vessels of the brain, (including the whole of it, that is, the brain, cerebellum, membranes, &c.) all *turgid with blood;* although it never happened (in any of the cases which he has caused to be dissected,) that there was any peculiar affection of *one part* more than of another; or any thing like *suppuration.*

From the foregoing statement the author is led to think; that from fever itself, (and without any accident or irregularity,) two species of delirium arise; one *without any material affection of the brain;* the other with *fulness of the vessels* of the brain.

Independently of [what is thus discoverable by the aid of dissections,] the author conceives that *External* appearances of *the Two* kinds of delirium take place, in *consequence of a regular continued fever itself;* which he now means to attempt to describe.

The *first species* seldom happens in the first paroxysm of a regular continued fever, (excepting it be very severe).--There is very often some appearance of it in the *second* evening of the disease: The patient sleeps confusedly; immediately upon waking, he does not recollect his bed or bed-chamber or the people that are about him; but recollection returns in a few minutes; the eyes are sufficiently clear (neither confused nor stupid;) nor are the blood vessels fuller than in the ordinary state.---There is a degree of *perfect* stupidity and listlessness in the appearance of the eye, which takes place not uncommonly in the first exacerbation of a continued fever; (which is a very fatal symptom;) but which the author thinks is an *irregularity* in the disease; (and which in consequence will be taken notice of in a future dissertation.)---The *want of perfect recollection,* (if the disease is not very violent,) goes off generally in the morning, about seven or eight o'clock of the civil day; and the patient remains recollected till the beginning of the *fourth paroxysm;* but yet not perfectly clear in his ideas, and in full possession of the powers of his mind.---*Every evening* the delirium grows *more and more severe;* (but still there is very considerable relaxation in the *day time;)* and this continues to increase, until the seventh or eighth day of the disease.---When this kind of delirium arises to a great height, about five or six o'clock in the evening, the patient begins to be very confused; hardly knows the people

aim; t much and confusedly about his affairs; and is vio-
This v nce increases till about midnight; when, if the dis-
is very gr t, he endeavors to jump out of bed or tries to climb
top it; and becomes perfectly unmanageable: This
two or three o'clock in the morning. Then by degrees
es; and he becomes something more sensible about four or
ck in the morning. Afterwards perhaps he gets a little
awakes not so confused; and during the day time, remains
less sensible to external objects.---These appearances go on
same for five or six days, *if no crisis should take place.*---
t the *fourteenth* day of the disease this delirium begins to sub-
the patient becomes much more sensible in the day time; the
ng attacks become much more conspicuous, although not so vi-
until the disease finally goes off;—*the delirium being almost*
t symptom of it that disappears.

he *second species of delirium*, arising in a regular continued fe-
from the *fever itself*, seems to go through the following pro-
—Like the other, it begins to appear in the second paroxysm
disease. There is in the evening the same confusion in the
on; the eyes have their vessels somewhat enlarged; the
re a little flushed.— These appearances go on increasing
the first week of the disease; the confusion grows greater in the evening, and sometimes all that violent agitation (which has been described in the former species of delirium) takes place; but in that case the patient does not recover in the morning, but lies stupid and almost insensible. Afterwards if the disease be very violent, a stronger and more violent degree of delirium begins to take place between five and six o'clock in the evening; which increases until two or three o'clock in the morning; and then by degrees the patient again falls into the same stupor. If this should continue till about the fourteenth day, the evening attacks become by degrees less; but the stupor continues, with deafness and inattention to external objects; and these appearances remain *as the very Last symptoms of the disease.*—The author is rather induced to believe, (from the fulness of the vessels of the eye, the flushing of the face, and the continuance of the stupor after the fever is gone off;) that in *this species* of delirium, the *material* part of the brain is affected;---especially, as when patients have died of this species of delirium, the author (upon dissection) has found the vessels of the brain *distended with blood.*

It is to be observed, however, that between these two appearances of delirium *there are gradations*; (as we find in almost every thing relating to the human body).

Whether the author be right or no, in supposing that there are *two species* of delirium depending upon *fever itself*; he nevertheless concludes that delirium (whether it be of one species or the other,) *affects not only the mind; but the functions of the body also.*

From the *second day of the disease*, the delirium (if it takes place,) gradually increases; and along with it, all the appearances of fever. The tongue grows fouler from the beginning to the middle of the second week, (excepting where there are appearances of putrefaction, as have already been enumerated:) there being indeed no sliminess, but a greater crust. Towards the end of the second week this crust, more or less, disappears; and the surface of the tongue looks raw when moist: when dry, it has a polished glaze, especially about the middle: (some of the crust remaining upon the sides, towards the edges).---The skin has a more dusky color, and feels uneasy. The patient picks hairs from the bed clothes. The eyes appear more confused: black spots seeming to the patient to be moving in the air. The appetite is more or less diminished; and often totally lost. Spasmodic contractions of the intestines take place in a greater degree. The pain in the forehead (or rather the sensation of it,) is not so much complained of. The secretions continue suppressed; the skin dry, &c. There are greater flatulencies:—*And the fever every way increases along with the delirium.*

Whether it be that the fever is gradually increasing, and delirium along with it; or that delirium is the occasion of the increase of it; the fever goes on *in proportion with the delirium.*

Although the patient should be insensible to all external objects; although he should sleep very little, or scarcely at all; yet, if the *deglutition and respiration* should remain unimpeded, the patient is not to be despaired of: it happens even most commonly that he recovers.---But if he *respires with great difficulty*, or hardly at all; or if the *deglutition* be almost totally prevented, or if the attempt to swallow throws him into convulsive contractions; he rarely recovers.

On the other hand, even if the other febrile appearances *do not keep pace mith delirium:* (that is, though the pulse should become more slow, and less obstructed; though the tongue should become cleaner and moister; though the color of the skin should become more natural: the secretory vessels more relaxed, without stupor or deafness and other marks appear which have been pointed out as accompanying delirium;—yet if there be fulness of the vessels of the brain; (notwithstanding the practitioner and by-stander are flattered,) the patient is frequently cut off.—When these last described appearances takes place, (that is, if delirium continues of the first kind without diminution,) the author has conceived that *some mischief has happened to the brain, or some other part of the body*. But, although he has caused several to be opened who have died under these circumstances; he has never found any appearance different from what is commonly found in persons dying of diseases, which make no alteration in the structure of the body.

Thus the fever continues to increase, from the beginning of the first, and sometimes to the middle of the second week; and continues in the same degree; unless it should be carried off by a *crisis*.

A *Crisis* in a continued fever, as described by Hippocrates, has been a matter of great debate; not only since, but probably long before his time.

A crisis which takes place in a regular continued fever may be considered thus. The author has stated that a *continued* fever differs from an intermittent in this respect; that in an *intermittent or remittent*, the paroxysms (or exacerbations) recur principally between six o'clock in the morning and five o'clock in the evening of the civil day; but that in continued fever, the exacerbations take place between five and six o'clock in the evening.—When a very severe exacerbation occurs in a regular tertian intermittent, the author has already said (in a dissertation on that subject) that a complete crisis sometimes takes place; and carries off the disease. In like manner, in continued fever, if a strong exacerbation should happen in the evening; the severity of the attack may prove fatal: but on the other hand, instead of producing only a relaxation between five and six o'clock in the morning, it may occasion a complete crisis; and so in a few hours terminate the disease.

In speaking of a crisis in a regular continued fever, it is always to be understood, (and is so considered by Hippocrates,) that there may be a bad crisis, and even a fatal one, from the violence of the attack of that paroxysm; or a good crisis, carrying off the disease altogether, or giving it great relief.

The first thing to be taken into consideration is, whether *any* such crisis ever takes place or not.---How this should have become a question can hardly be conceived; (since instances of such crises must have occurred to every practitioner who has had occasion to see a number of cases of the disease).---Others however insist, that crises happen in *all* continued fevers: but this opinion can never be held by any practitioner who has had much practice in England.

In different climates, the taking place of crises has been variously described.---In very *hot* climates, fevers are represented (by practitioners versed in the diseases of those climates) as if they were all intermittent or remittent; in which case, more or less perfect crises always takes place: (to wit, in climates in which the temperature of the atmosphere in the shade is from about eighty degrees to one hundred, or an hundred and ten).---The same thing is also true where the *variation of the temperature* is very great: as in Carolina; (where in one day, from the variation of the wind, the heat may rise from under ten to upwards of sixty degrees of Fahrenheit's thermometer.---In countries *not quite so hot and not so variable,* (as in the Meditterranean;) authors have described continued fevers as almost always terminating by crisis.---In *England,* as far as the author's observation has gone; *hardly one third of its fevers* have been carried off by crisis, such as the author has just described.---In *colder* countries, where the inhabitants expose themselves to the temperature of the cold atmosphere, (as in Siberia;) continued fevers are very rare: and crises scarcely ever take place.

Hippocrates has not only laid down that continued fevers *are* terminated by crises;---but also that these crises *take place on certain particular days of the disease;* which he has called *critical days.*---This doctrine has afforded a ground of great dispute.

When it is affirmed, that a fever terminates on a certain day of the disease by crisis, the first question undoubtedly is, *What is to be accounted the first day of the disease.*---The author has endeavored to show, that the beginning of the Fever is not to be counted from the hour of the first attack: but from the *Second Attack,* (or *first exacerbation* of the disease,) which begins between five and six o'clock in the evening.---He has said that most commonly, if the disease begins *before* six o'clock in the morning; the *second* attack takes place between five and six o'clock in the evening of the same civil day; and by consequence that the fever is to be considered as beginning between five and six o'clock in the evening of the preceding civil day:---but that generally, if the *First* attack be *after* six o'clock in the morning of the civil day (as is commonly the case), the *Fever* cannot be considered as beginning till five or six o'clock in the evening of the same civil day; since the second attack (*or first exacerbation* of the disease) does not happen till five or six o'clock in the evening of the subsequent civil day. (In other words; supposing the disease should take place between six o'clock in the morning of Sunday, and six o'clock in the morning of Monday; the *beginning of the first day of the fever* must generally be taken between five and six o'clock in the *evening* of Sunday.)---There are some cases in which there are *Exceptions;* (but these will be considered among the irregularities which take place in the disease).

Having thus pointed out from *what time* we are to reckon the beginning of the disease; and that *crises* take place in the first twelve hours of the exacerbation; it will be easy to settle the *Days of the Disease on which crises occur*.*

Excepting the intermittent and remittent fevers, crises very rarely happen in the *first week* of the disease; unless on the *seventh day*. ---Hippocrates enumerates however (in the different works ascribed to him,) the fifth, sixth, seventh, ninth, eleventh, thirteenth and fourteenth, seventeenth, twentieth and twenty first days, as *Critical days*.---He also says, that although these be the true critical days; yet that there are *spurious* critical days, (viz. the eighth, tenth, and twelfth, &c.); and that it is known whether the fever had perfect or spurious critical days, by one day being an indication of another.--- Hence, if you find a strong exacerbation take place on the seventh, and also considerable relaxation between five and six o'clock in the morning; that is, if a coldness takes place about six o'clock in the evening, or at least considerable dryness of the skin, very great heat, greater foulness of the tongue, and more violent delirium on the beginning of the seventh day, (viz. between five and six o'clock in the *evening;)* and if these appearances increase very much till three or four o'clock in the morning, and then subside, and the patient is more sensible than he was the morning before; if his skin and tongue become moister, his tongue cleaner, and the secretory vessels relaxed: although no complete crisis take place, you are to consider in that fever the seventh, ninth days, &c. as the *true* critical days; (and that the patient had a better chance of recovering on these days.)—On the other hand, if a stronger attack and greater relaxation take place first, at the beginning of the eighth day of the disease; then the disease will observe *spurious* critical days; and the tenth, twelfth, &c, will be the critical days; and the patient will have more chance of recovering on these days:—But in this last case he will have a less chance of the crisis being so perfect, or of carrying off the disease.

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* See a note at the end of this Dissertation.

The only plausible mode of *accounting for these critical days*, is that which was pointed out by *Dr. Cullen*, (in a clinical lecture he gave about the year 1797;) to wit, that continued fevers observe in some degree the types of intermittents.—He said, that during the *first week* of a *continued fever*, it observed the quotidian type; that in the *second*, it observed the tertian type; and in the *third*, the quartan type; that is to say, that in the first week, every day's paroxysm increased; (by which is to be understood, that the third paroxysm was greater than the second; the symptoms of the fourth were more severe than those of the third, &c.;) that in the second week there was a stronger exacerbation one day, and less strong the next day; and that in the third week there was a strong exacerbation on one day, and on the two subsequent days a weaker exacerbation; and that on the beginning of the fourth day, (counting exclusively,) a stronger exacerbation again took place.—Again, he said, that it often happened in *intermitting fevers*, that a paroxysm occurs every day; but that the paroxysms were unequal; (the paroxysms every other day being slighter, and every other day more severe:) or that they might begin at other times of the day. In other words supposing a severe paroxysm (after the intermittent was formed) had occurred on Sunday at noon; a paroxysm might take place on Monday, (which might be either at noon, at ten or eleven o'clock in the morning, or one or two in the afternoon,) but less severe: and again, that if on Tuesday a stronger paroxysm took place at noon, (similar to that which took place on Sunday,) a slighter paroxysm might take place on Wednesday similar to that which took place on Monday.—Such cases he called *double tertians*: (they were also called double tertians by many of the ancient Greek and Roman physicians, and likewise by practitioners after the revival of the science of medicine in Europe.) In such cases, Dr. Cullen observed, that the severe paroxysms were shorter, and productive of more perfect crises.—If therefore the continued fever should be *governed by a tertian type* in the second week of the disease; the paroxysms, or exacerbations, might recur every day; but be more strong every other day, and terminate with a more perfect crisis. They might indeed be so short, and terminate with such a perfect crisis; as entirely to carry off the disease.—In like manner, if a continued fever *observed a quartan type*, and there were two slight exacerbations after a severer one; followed by two slight exacerbations, and then again a severer exacerbation, (and so on;) there was a greater likelihood of the severe exacerbation being the shortest and being followed by a more perfect crisis: and often by so perfect a crisis, as to terminate the disease.

Connecting this idea with what has been said above, a continued fever observes the *quotidian* type in the first week.—If a crisis takes place after the first two or three exacerbations, the disease recurs; and becomes an intermittent fever.—But if it goes on as far as the fifth day, and a crisis should take place on the fifth day of the disease, that crisis would terminate the fever entirely; and the same thing may be said of the sixth day; (but these two days seem to be uncertainly marked as critical days, complete crises happening on them rarely.)

If the first paroxysm of the *tertian* type should take place on the seventh day, then there would be a chance of a crisis on that day; (and in consequence, on the ninth, eleventh, and thirteenth days.)

As far as is known, there is no reason for believing that the fever *changes its type more frequently on the seventh,* than upon the eighth day;—and therefore if the fever changes its type on the eighth day; the eighth, tenth, and twelfth would become the critical days in the second week, (and according to Hippocrates would be spurious critical days.) Hippocrates accordingly says, that if you find a severer attack take place at the beginning of the seventh day, and go off with some critical symptoms, (such as moisture on the skin, greater cleanness of the tongue, &c.) then you are to conclude that the seventh, ninth, eleventh, and thirteenth days are the critical days of the second week.---If a stronger exacerbation should take place on the sixth or eighth days, followed by critical appearances, (as have been above observed); then you are to reckon the eighth, tenth, and twelfth the critical days of the second week; and so far (according to Hippocrates) the critical days are the days of the stronger exacerbations of the tertian type in the second week.

If again the fourteenth day should be the first day of the *quartan* type, then there would be greater disposition to crisis on that day. Indeed the *fourteenth day is by much the most common day on which a crisis takes place.*---If the fever was now observing a quartan type; the fifteenth and sixteenth days being days of weaker exacerbations, there would be little chance of crisis upon them: and on the seventeenth day there would be a stronger exacerbation according to the quartan type, and in consequence a greater disposition to crisis: on the eighteenth and nineteenth days, there being weaker exacerbations according to the quartan type, there would again be less chance of crisis upon these days; but on the twentieth day, there being a stronger exacerbation again, according to the quartan type, there would be a greater chance of crisis on that day. —*This doctrine will by no means agree for the twenty first day;* which it is more probable that Hippocrates (and the physicians of his time) reckoned the critical day, instead of the twentieth, because it was an *odd day;* which they considered more fortunate than an even day.---(This whim was probably the ground of their considering the seventh, ninth days, &c. as being the true critical days, and the eighth, tenth, &c. as spurious critical days.)

In compliance with this idea, some of those authors, who have admitted the fourteenth as the most common critical day, (as it has actually been found in practice,) have called it an *odd day*; because it was the *second seventh*;---and so have perhaps likewise admitted the twenty first among the critical days, as the *third seventh.*

The *truth* of this doctrine may also be supported by what happens in *hot and cold climates.*---It has already been said, that crises much seldomer take place in cold climates than in hot climates; and also that fevers are much oftener intermittents and remittents in hot, than in cold climates:---it is much more probable therefore, (as intermittents are governed by types,) that types have a greater power over *continued* fevers in *hot climates*, than in *cold ones.* This perfectly accords with Dr. Cullen's doctrine.

It has already been said also, that *not above one third part of the fevers which happen in London* are terminated by a crisis: that is to say, in not above a third part of the fevers which happen in London, does a much stronger attack take place in any evening, than took place in the evening of the civil day before; and either kill the patient; or otherwise terminate with so complete a freedom from the disease before eight o'clock in the morning, as to render him (should there be no relapse) perfectly safe.---In cases in which no actual crises take place, still it sometimes happens in regular fevers in England, (but not always,) that there are stronger exacerbations every other day in the second week, and every fourth day in the third.---By the end of the seventh day, the fever has often increased to nearly its greatest height; when it is regular; and the second week is sometimes gone through without very distressing symptoms. But sometimes cases with symptoms of the greatest distress and danger occur.---And there are all gradations between these extremes.

It is necessary that the author should here observe, that he has been describing the disease and its progress, *when it has not been increased or rendered irregular by imprudent practice.*

The appearances then in the *Second Week* are sometimes, frequency of the pulse, to perhaps an hundred or an hundred and five, in the evening: and in the morning, from ninety five to an hundred. (In many cases of fever the pulse is much more frequent: but this will be described as an irregularity in a future dissertation.)---The tongue is covered with a brownish fur; which is not slimy, excepting when putrefaction takes place, (as has already been described.) When the disease is severe, it is not uncommon for the middle of the tongue especially to lose this fur; and appear, when moist, cleaner and rawer than it is in its natural state; and when dry, with a degree of polish as if it were glazed over.---The eyes have always (provided the fever be regular) a degree of confusion; but it is greater or less, as there is more or less delirium (as has been already described.)---The skin is of a dirty dusky color; and this symptom is in a greater or less degree, according to the violence of the disease.—If the head-ach is often less complained of by the patient; his occasional silence on this subject appears rather to depend upon the confusion of his mind, than upon his head's being actually relieved.—The appetite is often totally lost.—The patient frequently speaks less of thirst during the second, than during the first week; but this want of thirst probably arises from the disturbance of the mind; for sometimes (especially when the fever is very violent) he will drink a great quantity at once, and at other times in the same circumstances will hardly drink an ounce.—The skin continues very dry and parched; (that is, feels very hot and dry to the by-stander.)---The urine continues perfectly transparent, as has been described.—There are flatulencies in the intestines: generally with costiveness; but now and then there are one or two thin and very fetid evacuations in twenty four hours; even when there is no other appearance of putrefaction.—The sleep (when the patient obtains any) is more or less quiet; partly according to the delirium, and partly according to the general restlessness.

If the fever should be slight, and perfectly regular; if the practitioner has patience, and does not press the patient with improper remedies, nor the by-standers apply improper nourishment; this stage of the disease passes over with tolerable tranquillity.---On the other hand, if the delirium and other symptoms of fever be very violent, it proceeds, with the utmost anxiety to the practitioner and danger to the patient.----The issue in these cases happens in all gradations, from the most severe and fatal, to the slightest.

Provided there has not been such a depression of strength as to occasion putrefaction of the fluids (and by that means to destroy the patient:) provided that neither of the kinds of delirium which have been described should prove fatal: that the patient also should not be destroyed, by strong symptoms of fever taking place at the beginning of a critical paroxysm: that the delirium when of the first species described, keeps pace with the other symptoms of the first stage; or if of the second species, begins to be converted into deafness and stupor: and lastly that the fever was of itself perfectly regular; and has not been rendered irregular by improper treatment:---it *then rarely happens that it is dangerous after the second week.*

On the *fifteenth day, and often sooner,* the symptoms of the disease begin to *abate.*

The first appearance of this *Abatement* is not uncommonly a cleanness and healthy look about the edges of the tongue; or sometimes the skin becomes of a more natural color; sometimes (although not very generally) a sweating takes place all over the body, and the skin afterwards continues moist. The delirium, if it be of the first kind, abates in the day time, and returns at night: or if of the kind, th patient is deaf and stupid, with little difference in en hours; and this deafness and stuper remain until disease has disappeared.---The *depression of strength* f, but leaves real weakness behind.---This is at no icuous, than when the depression has been so great *trefaction* of the fluids. In *this case*, all the ap- f putrefaction which have been already described, begin ; (that is to say, the tongue is no longer covered with , nor the teeth buried in it; but the tongue generally looks raw, st, and with a polished gloss on the surface when dry; the s the skin; or, if there were any purple spots, and disappear; the breath and secretions nor bear other marks of putrefaction.) This arances of putrefaction does not happen at ing is should take place; (and then they go off entirely in one night.)

It is to be remarked, that in the *second* week of the disease it often happens, that an *Eruption* takes place on the skin; (quite different from that marbling or those purple spots, arising from the putrefaction of the fluids.)---This eruption sometimes happens even in the first week of the fever; but much more commonly in the second week.---It occurs principally about the neck and breast, and resembles very much the appearance of flea bites; (that is, there are a number of small brownish red specks, often not the twentieth part of an inch in diameter; with a brownness of the surrounding skin.)—How or why this eruption takes place the author could never satisfy himself:—And perhaps it is of no great importance, since the course of the fever is not at all altered by it: the fever neither being increased nor diminished by its appearance, nor any ways apparently altered; neither is there any increase, alteration, or diminution of the fever, upon its going off; (which it does commonly in a few days.)

There is also *another kind of eruption*, which does not commonly take place before the *third* week of the disease; and more frequently occurs when there have been symptoms of putrefaction in the first and second week.---This eruption consists of excrescences, something like warts; but of less diameter, and greater height from the skin; of a blackish color; and of pretty fine texture.---The author has not been able to discern any cause of their taking place, more than in the preceding instance; nor any consequence arising from them to the patient, (either in the appearances of the fever itself, or otherwise).---This appearance is much less frequent than the one just described. These eruptions are not nearly so numerous, nor are they dispersed all over the body.---They seldom appear before the end of the second week: and they go off (or rather the excrescences drop off) about the middle of the third week; without any increase or diminution of the disease.

To *return to the abatement of the disease in the third week*:---The urine sometimes deposits a copious lateritious sediment for a day or two, and afterwards returns to its natural appearance. Sometimes there is a copious *lateritious* sediment in the urine made in the *night*; and a *mucous* sediment in what is made in the *day*..--The costiveness goes off; and the feces return to their ordinary appearance.---The eyes (unless when the delirium has ended in stupor) begin to have a more healthy appearance; are more composed; and express a greater attention to the objects around them.---All the secretions become gradually increased: not equally; but sometimes one increases, and sometimes another.---The sleep returns, but not in an uniform manner; (the patient sometimes passing a tolerable, at others a restless night).---There is sometimes a greater degree of thirst than was shown in the second week.—The appetite returns, but seldom regularly: (being sometimes voracious, though the patient is notwithstanding satisfied with a very small quantity of food: in other cases it returns very slowly).—The depression of strength sometimes goes off almost at once; and (what is singular) leaves the patient with a greater feel of weakness.—Thus the disease disappears, and the patient recovers his strength very quickly.

The cases, in which *Relapses* take place, will be described in that dissertation which will treat of irregular continued fever.

The author comes now to lay before the public the TREATMENT of a regular continued fever.

It has been stated, that in the ordinary course of a regular continued fever, there are two means by which the patient may *recov-*

er; *without the aid of medicines.*—*One* of these is *Crisis;* which terminates the disease most commonly in the second or third week, in less than twenty four hours.---The *other* is, the disease *beginning to diminish after the fourteenth day;* and going off of itself, without any marked crisis.---(If either of these means of terminating the disease by the efforts which arise in its ordinary progress, always took place; the practitioner would in that case have nothing further to do, than to take care that the patient should be supplied with proper nourishment to support him through the disease, and prevent any accident which would destroy him.)—It has also been observed, that sometimes depression of strength, sometimes the attack in the critical paroxysm, sometimes the delirium, (even when it merely keeps pace with other appearances of the disease,) is *fatal.*

There arises, therefore a question, whether fever is to be left to itself, to go through its ordinary course;---or whether means are to be taken to carry it off;---and what these means are?---In considering this subject, it is evident, that if there was any medicine that would certainly carry off the fever immediately, or soon after its exhibition; and would act equally and certainly in all fevers; it would be infinitely better to employ such medicine, and immediately relieve the patient from the pain and uncertainty of the disease; than allow it to pursue its course.

It is true that any attempt to carry off fever, has been reprobated by many practitioners of great experience.---Many practitioners have believed that some *humor,* (that is to say, some noxious fluid,) or to give the doctrine its full scope, some noxious solid or vapor; by some means gets into, or is produced in the body; and that fever is only an exertion of the body to destroy or evacuate this matter, or convert it to an innoxious or useful substance. The author however has never read or heard of any experiments, by which any such noxious matter was proved to exist. (It appears indeed, that sometimes a degree of putrefaction arises in the body; but this has been already sufficiently considered.)---In the next place, the author has already observed, that all fevers produce some substance, which (if applied to the body of a man in perfect health) has a tendency to produce, and actually has produced fever in many cases; but he has also endeavored to show, that this infectious matter has no influence on the fever, when it has once been excited.---In practice moreover it is found, that if a person ill of a fever, has that fever terminated in consequence of medicines employed; the fever does not return; nor does any other disease take place.---It is however exceedingly difficult to argue on the negative side of a question. * * * If there be however actually any noxious substance in the body, why have not those practitioners who have said there was; pointed out its properties? Is it solid; is it fluid; or is it in vapor in the heat of the human body? is it red; is it yellow; or is it blue; or any mixture of these colors? is it hard or soft? has it any taste or smell? what is its specific gravity? have its effects been investigated in mixing or combining it with various other substances? If those who suppose such matter to exist, have not shown that it can be investigated by any of these or by other qualities; it is a phantom of their own brain.---It has however been a common assertion, that although you are not able to demonstrate it by any such quality; yet it cannot be demonstrated that it is not. But can a practitioner gain any more by this assertion, than by saying, that the moon cannot be demonstrated not to consist of cream cheese?---So far, therefore, in treating a patient in fever, this idea of *humor* is to be totally neglected.

Since however many practitioners of eminence have assumed the idea, that there is some humor or matter in the body; it may be worth while to inquire into the *origin* of such belief.

In fever itself, there is only one appearance which can give any shadow of probability to such a doctrine. This is, if a crisis should happen in a fever, which appears to be a continued one, on the first, third, or fourth days of the disease; the disease commonly returns, and continues as an intermittent. If a crisis should take place soon in the beginning of the second week, and not be quite perfect in itself; relapses frequently take place. If a crisis should take place towards the end of the second week, it is seldom that the fever returns; although the crisis should not be quite complete. In the third week of the disease, if any thing like a crisis should make its appearance, the disease almost always goes off.---It has been said, that this depends upon an effort of *Nature* to throw noxious matter out of the system. It has been supposed for example, that at the beginning of the disease, this matter not being concocted, the effort of nature is premature; and that therefore the matter by remaining, occasions the fever to return, and to become an intermittent: That when the crisis is delayed till towards the end of the first or beginning of the second week, the matter becomes more concocted; and nature by her efforts throws off a larger quantity, and there is not enough left to occasion an intermittent; but yet enough sometimes to occasion a relapse: And lastly, that if nature does not make an effort to produce a crisis till towards the end of the second or third week, the matter has been so far concocted, that from that time it ceases to be capable of reproducing the disease.---The author however can only consider all this as a repetition of the same facts in other terms.

What is *nature?* is it a discerning being? for if it is, it is very much mistaken when it tries to throw matter out of the body before it is concocted. Nature indeed is a word so vague, and is applied in such ambiguous and various ways; that it is impossible it should be understood: but it is a term under which men are always inclined to hide their ignorance. The author is not disposed to point out the various ways in which it has been used; (for on this subject he refers his readers to Lord Bacon:) he only means here to endeavor to point out the meaning (as far as he can judge) in which it has been taken by those, who have said that nature endeavors to produce a crisis in fever before matter is concocted.---A man is born with few or no ideas: (whether with any or no, is a proposition the author does not mean to argue.) When he comes into the world, his eyes open; and objects form pictures on the retina, and by degrees impress ideas on the mind. It has been said that nature produced these ideas. In that case however, it would undoubtedly be perfectly superfluous that pictures should be painted on the retina.---The same thing may be said of the other impressions made on the other organs of the senses. A man, when he is born, has his teeth formed in his jaw-bone: and if after the proper time of his receiving nourishment by sucking the breast of his mother, the teeth rise up and cut through the gum; it has been said that nature makes his teeth rise up, when it is necessary to cut through solid food. It is undoubtedly the Almighty (who cannot err) that made this contrivance; and not nature, a secondary fallible, and imaginary being.--In like manner, in inflammation; a quantity of fluid is extravasated into the cavity or cavities of the inflamed parts; this matter so extravasated, is converted into pus, destroys the part originally inflamed, makes its way externally, and is evacuated out of the system; leaving a cavity, which is afterwards filled up by granulating flesh: a fresh skin is formed over this; and the granulating flesh is converted into parts similar to those which were destroyed. This surely was a contrivance of that Being, who in his infinite wisdom created all things: why should we transfer it to a secondary imaginary being?—So *in fever*, the author has endeavored to show, that when the attack of fever takes place, it is followed by a hot fit; and that the operations of the body which take place in the hot fit, have a tendency to carry off the derangement which has taken place in the cold fit.—So also it has pleased the *Almighty* to give powers to the human body *capable of producing a crisis, which carries off the disease.*—Why should there here be introduced such an imaginary being, as nature, to make blunders; (not knowing when some other imaginary substance has suffered an imaginary change)?—Is it not much easier comprehended, that the body is so constructed, that in all paroxysms of fever, an effort is produced to carry off the disease: although that effort does not always succeed?—Nor do other efforts always succeed that the Almighty has pleased to give to organized beings. (All seeds of plants attempt to grow; though not one in a million succeeds: And a single cod fish lays three millions of eggs in a year; though not three of these produce codfish which arrive at maturity.)—It is not therefore singular, if the Almighty has chosen so to form the human body; that every attack of fever should produce a hot fit, in which operations of the body arise tending to carry off the disease, but which in fact do not always succeed. Is it then necessary to have any reference to a secondary and imaginary being, who may make a blunder: and try to carry off matter, before it is prepared for it?—The fact is, that a fever begins gradually, increases to a certain point, and there continues for a certain time; afterwards (if the patient is not killed in the manner already mentioned or cured by a crisis) it gradually diminishes; and goes off without any cause which has as yet been discovered.

But let us return to the consideration, whether a fever should be left to itself; without the practitioner's employing any means to carry off the disease, (but only attending to the patient during the progress of it): or whether he ought to employ some remedy to attempt to carry it off; (either by producing a perfect crisis, or by carrying off the disease without any attention to the natural crisis by which it is frequently cured).

The first th ng which influences the practice is, the inquiry what remedies hav been found out—by which a perfect *crisis* may be produced; or h may cause the disease to be *carried off*, without any attention natural progress or cure of it.

The *first* t g that is of moment in attending to this proposition, is the *efficacy o such medicines as have been employed* for the purpose of shortening the duration of fever. And whether actually more fevers have been cured (so that the patient has perfectly recovered,) when such medicines have been employed; or when the fever has gone through its ordinary course.

This question is exceedingly difficult to determine, from *the very great inaccuracy of the evidence as to medicine*; (an inaccuracy so great, that the author himself has no means of determining the stion).—It is true in the *First Place*, that besides his private ctice for upwards of twenty five years; he has been physician to ospital, which receives nearly four thousand patients in a year; in which patients laboring under fever, are always admitted in erence to others. There is almost always also febrile infection, h frequently produces fevers in this hospital; notwithstanding utmost precaution to keep it clean and well aired.—He therefore might be supposed to possess sufficient evidence, for determining whether a regular continued fever more frequently terminates in patients being restored to health, when they are left entirely to themselves, (excepting for the attendance given them, their receiving proper nourishment, and other safe-guards during the progress of the disease); or whether a greater number recover, when means are employed to shorten the disease.—It must be observed, however, that those people brought into the hospital already afflicted with fever, may have had the course of that fever disturbed, by remedies employed before the patients are received into the hospital: though this cannot generally be found out. These fevers are besides rendered irregular by the motion and fatigue of bringing the patients into the hospital. Those who catch the fever in the hospital are likewise often ill of other diseases: the symptoms of which are so intermingled with the fever, as to render it perfectly irregular.---From these causes the author has not been able to discriminate, with any degree of certainty, what number of patients would recover, supposing they were taken ill of a regular continued fever; the fever being supposed left to pursue its ordinary course, without the assistance of medicine.---In the *Second Place*, the *practice of medicine is so unfortunately constituted in England*, that when a person is taken ill of any disease; he generally does whatever the first violent man he meets with tells him is proper to be done: or he applies to mercenary practitioners, (whose business it is to mix medicines according to the prescriptions of physicians who are supposed to have studied the art; without its being decided whether the cases are the same).---Supposing, therefore, that physicians were even very perfect in the knowledge of fever, the disease is commonly totally deranged before it comes under their inspection.---If they were to endeavor to lay down the evidences by which it might be determined whether a regular continued fever, in pursuing its ordinary course, would more frequently terminate in health, supposing it was left to itself, (the practitioner attending only to giving the patient proper food, and taking care that those other things, which are called non-naturals, to wit, sleep, secretions, &c. be properly regulated): or whether the patient would more frequently recover when medicines were administered: still it would be hardly possible, without such a formula, as the author has already pointed out, in the *Medical and Chirurgical Transactions*, to determine the question with any degree of accuracy.---It is further to be lamented in the *Third Place*, that where this difficulty does not take place, (as it certainly does not in several parts of Europe, where the practice falls entirely into the hands of physicians,) yet no *sets of comparative cases have been recorded.* These physicians have not pointed out whether the disease, in pursuing its own ordinary course, (what have commonly been called non-naturals having been only attended to,) has oftener terminated in health; than where medicines have been employed to carry off the disease. Physicians have been too often more anxious to recommend some favorite practice or medicine: than after divesting themselves of all prejudice, to endeavor to render medicine as certain a science as it will admit of being made.

Such being the situation of the subject, how can the author determine, whether (supposing fever was perfectly regular) it would be better to let the disease go through the whole course; or endeavor to carry it off by medicine?---It is therefore left to him to show *First*, how to *conduct the patient through the disease*, (supposing the fever perfectly regular in itself; and that nothing has as yet been discovered, which will carry off the disease at once:)---and in the

Pl consider what are the *powers of the medicines*, which
n su sed to produce a *crisis* similar to that which takes
ordinary course of a continued fever, (as has already
ibed ;) or to *carry off* the disease in a manner altogether
those, which put an end to it in its ordinary course.

t argument therefore to be pursued is, what attentions are
l, *supposing we are to do nothing that shall prevent* the fe-
n going through its ordinary course.

first attention to be paid is to the situation of the patient [as to
h.] Man evidently was originally an inhabitant of a warm
te only ; where he wants no more covering to defend him from
lemency of the atmosphere, than what he was born with or
grows upon him. He was probably driven into colder
war ; and in colder climes he began to have more
still, however, it was necessary for him, even in perfect health,
nd himself by external clothing ; and, when without exercise,
heat to the atmosphere by various means which he invented,
ularly by the burning of fuel.—A man affected with fever has
wers of his system depressed ; and therefore cannot defend
elf against the cold of the atmosphere. Besides ; a degree of
cold greater than a man has been accustomed to, contracts all the external vessels ; and therefore prevents that relaxation which ought to take place in the crisis ; and of consequence tends to prevent a crisis from taking place. It also tends to render the diminution of the disease in the morning less considerable.—On these accounts, a man in a fever should *not be suffered to remain in an atmosphere* (or any other medium) *of too small a degree of heat.*

The heat of the surrounding bodies has a different effect on the human body, according to the degree of heat it is *accustomed to bear.* A man accustomed to live in a heat of 90° of Fahrenheit's thermometer, will feel surrounding bodies, heated to 70° extremely cold; (he will feel them as cold as a man accustomed to live in 70° of heat, will feel a medium of 60°). Therefore, in defining the heat in which a man should be kept in a fever, reference must be had to the country he is in.---In London, in the summer, an atmosphere heated to 65°, will not do mischief from being too cold; nor in winter, will an atmosphere heated to 55°, be noxious from its cold.---In other climates, different rules will take place ;

and what these rules are, the author cannot accurately lay down. But he conjectures from what information he can procure, that in the warmest climates, 80° would not be noxious from its cold in the atmosphere; and that in the coldest climate, less than 50° would be hurtful.

There is a great difference, however, in the degree of heat which the atmosphere should have; and that, which the substances *immediately* surrounding the body ought to possess.---The *Atmosphere* is often only applied to the face, and drawn into the lungs; especially when a man is in bed.---The *face* has been accustomed to various changes in the atmosphere; and whatever part has been accustomed to such changes, is much less affected by them.---With respect to the *lungs*; the atmosphere is tempered in its passage through the nostrils, mouth, throat, larynx, and the beginning of the trachea; so that it cannot go so cold into the lungs, as to affect them much from its temperature. Moreover, there is in the atmosphere about a fourth part of a vapor, which we call pure air; which is necessary to be applied to the blood in the lungs, in order to give the necessary vigor to the system. As in a fever there is also depression of strength; it certainly ought not to be still more depressed, from a sufficient quantity of pure air not being thrown into the lungs. But since the warmer the air of the atmosphere is, it will be more rarefied; a less quantity of pure air will be contained in the same volume of it when the atmosphere is warm; while a small increase of coldness of the atmosphere thrown into the lungs, will be counterbalanced by a greater quantity of pure air giving vigor to the system. On these accounts, the atmosphere in which the patient is, may be colder than the bodies which immediately surround him.---With regard to the *Bodies which immediately surround his person*, their heat should be much superior to the heat of the atmosphere; in order that they may not produce contraction; (thereby increasing the fever, and preventing relaxation and crisis from taking place.) In England, the heat of bodies immediately surrounding the patient should never be less than 75° in winter, or 80° in summer.

The next thing to be attended to is, *How this temperature of the atmosphere*, and likewise the temperature of the *bodies* immediately surrounding the patient; *are to be kept up*.---In the first place; if the atmosphere be of too cold a temperature, its heat ought to be increased by some means which will not diminish the proportion of pure air in it; nor introduce into it any noxious vapor, or any

solid floating in it in small particles.---According
ich men have of procuring conveniences, (either in
alth,) different measures ought to be pursued; and
are not sufficient, the measures pursued must be
at can be afforded.*

next place necessary for the author to state, when
not in readiness; in what manner heat may be pro-
per degree.

ng to be attended to is, that the mode of produc-
si *ot diminish the proportion of pure air in the atmos-*
nor introduce any noxious vapor or any noxious fluid or
les floating in the atmosphere.---Therefore no fuel, (for
of fuel is the common mode of producing heat,) should
the room, unless all the vapors arising from it can be

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following passage made part of the original text in this place:
o wish to read it, may be content to see it in a note.

has sufficient means; the best mode of warming the atmosphere
w the air to enter into vessels surrounded by boiling water; after-
let it pass into vessels cooled (by any means) to at least 60° of Fah-
hermometer; there being in these latter vessels a means of allow-
nsed water to pass off, without any communication between the con-
d vapor and the vapor of the external atmosphere.—The air should then
pass from these vessels into another set of vessels, surrounded by boiling water; and from these the air so heated, should enter into the bed chamber of the patient; (so as to keep its heat up to the degree which has been pointed out).—The advantage of this apparatus is, that all the water which was suspended in the air of the external atmosphere will be dissolved in it, when it is drawn into the vessels surrounded by the boiling water; (as hot air dissolves a much greater quantity of water, than cold air). When the air is carried from the vessels surrounded by boiling water, into the vessels cooled to 60 [illegible] or under; the sides of these vessels will cool the air next to them; and precipitate the water dissolved in it as the air passes along, (for all of it successively comes in contact with the sides of the cold vessels). All the water which cannot be kept dissolved in the air in the heat of 60°, (or whatever less degree of heat is applied,) will be precipitated: and carry along with it all noxious particles, whether solid or fluid; (which will pass off along with the water in the apparatus applied for that purpose:) and thus the air will be left pure.—The air warmed by the second set of vessels surrounded by the boiling water, may be let into the bed chamber of the patient, in such quantity as to give the proper degree of heat.—Such would be the most perfect means of warming the chamber, of a patient afflicted with fever.

entirely carried off. For besides that the burning of fuel destroys a quantity of pure air, and renders it totally unfit for respiration; and therefore would oblige the patient (whose strength is already too much depressed) to make deeper or more frequent respirations, so that his strength would be further exhausted; there are also very often noxious substances (as vapors or small particles of solids or fluids) produced by the burning of fuel. (If there be, for example, pyrites or arsenical ores in the fuel; then volatile vitriolic acid, calx of arsenic, and other noxious matters, will be mixed with the atmosphere which the patient breathes.)—From this consideration, the room in which the patient afflicted with fever is, should never be heated by fuel burnt in a *chaffing-dish or brasier*; or by any contrivance by which the whole of the vapor arising from the burning fuel is not entirely carried off.---Moreover, if the fuel be burned in a *stove or furnace* in the middle of the room, or where the vapor arising from such metalic substances is not entirely carried off; two mischiefs will arise. In the first place a calcination of the metal will destroy the pure air; and leave the atmosphere (which the patient is to breathe) with a less proportion of it; and by consequence render it necessary for the patient to make more frequent and fuller respirations, in order to take the same quantity of pure air into his lungs. In the second place, it often happens that noxious vapors arise from metalic stoves in which fuel is burnt.—If, however, a stove or furnace, containing the burning fuel; has its exterior constructed of porcelain, or any other substance not altered by heat; neither of these causes of mischief will arise. If the outside of any such stove was to be heated to a much greater degree than that of boiling water; then indeed particles of animal and vegetable matter (which often float about the room) falling upon the surface of a stove, would be rendered empyreumatic; and so contaminate the air as to render it noxious when respired. The author then does not see any objection to heating the air of the bed chamber when necessary, by such a stove or furnace, (not apt to be at all decomposed or altered by heat); if the heat of the external surface of such stove or furnace is always kept under the heat of boiling water.—If the chamber be kept heated by fuel burning in a *grate or open fire-place*, (where all the air serving for the burning of the fuel, together with all the vapor arising from the burning fuel it s carrie f by a chimney); there certainly can no objection rom t inution of pure air in the atmosphere, or from noxter. n into it.—The only question with regard to the heat way is, whether it be perfectly and equally diffused chamber of the patient, (or at least over that part of patient is). If it be so diffused, no mischief can arise. air should be drawn into the room, in such manner as to he patient; then indeed this mode of heating the room have all the bad effects that have been above enumerated, as arising from the patient being exposed to too cold an atmosphere. tention should therefore be paid, that no stream of cold air be al- d to pass over the patient.—These are the means which have practised to heat the atmosphere surrounding the patient by el.—The author is not acquainted with any means of gen- at in the patient's bed chamber preferable to burning fuel. *xt* means of keeping the patient in a proper degree of *heat*, modes of heating the *substances immediately surrounding the* ell as the air of the atmosphere).—For this purpose, it er that a patient should be kept in bed; where the ore equally diffused all over his body, than when he is in rdinary clothing which he wears when out of bed. (There are r more cogent reasons for keeping him in bed in fever, which be afterwards enumerated.)---Supposing, then, that a patient should be seized with fever, and that he is immediately to be put to bed; if the bed itself is not perfectly dry, it should be dried and heated before a large fire; and clean sheets are to be laid upon it, which are also to be properly warmed, (as are the other coverings). ---The bed should by no means be heated by any hot substance, such as a warming pan; which, if there be any moisture about the bed or bed clothes, raises that moisture; thus doing essential mischief to the patient, as will afterwards be explained.---After the patient is in bed, the heat of the bed clothes or substances immediately surrounding him, *can only be kept up by the heat generated by the patient himself.* All that can be further done, (if it be necessary from the state of the external atmosphere to warm them) is, that they should be kept warmer, by forming them of substances which communicate heat with difficulty, (and which therefore confine the heat generated by the patient.)

It is likewise necessary that the *strength of the patient should not* *be exhausted by exertion.*---In the first place, the bed which is under the patient, should be of *soft feathers;* which were better loosely quilted, that they may be firm enough to give support without giving way; and at the same time sufficiently loose to be very bad conductors of heat.---(The author must here remark, that he is giving the best directions, as far as his judgment goes, knowing at the same time that they cannot be always perfectly complied with: yet it is necessary that the best should be known, that they may be approached as nearly as possible.)---*Some* have thought that the bed had better be a *mattress;* formed of wool or hair, firmly quilted. This the author conceives to be part of that superstition, which inclines men in health to believe, that it is a meritorious act to give themselves pain. In fever, the body should certainly be supported by substances, which make its own weight less disagreeable to the patient. (This observation however belongs to another object of attention during fever; what is now treated of, being only the heat of surrounding substances.)

Under the circumstances at present under consideration, the *heat is not to be lost by the patient's being laid upon good conductors of it.*

Upon these general principles the following directions are given. The covering over the patient ought to add, to the quality of not conducting heat readily, that of being of *very little weight.*---The immediate covering of the patient should be cotton cloth; (that is, his shirt and sheets;) as being less apt to conduct heat than linen. ---The author mentions, in the first instance, that which is the best, without regard to expence: Therefore, an *eider-down covering, quilted* in some thin material, is the best: for although certainly pressure of bed clothes ought to be avoided, (since supporting that pressure is an exertion of the powers of the body;) there is something in the habit of bearing pressure more than equal to such slight covering.---At any rate the *covering* which goes over the sheets should be, (where it can be had,) of the *newest and lightest woollen cloths,* such as are called blankets; (for the wool of animals is so constructed, as upon being pressed together frequently, to weave itself into a thick and heavy substance, called felt; which would by no means be a proper covering for a patient affected with fever).

All kinds of clothes, *when moistened with any watery fluid,* become much better conductors of heat than when they are perfectly dry. For this reason, if from the exudations from the patient him-in an[illegible]er way) they should become moist, they ought to [illegible]ved [illegible] fresh and dry coverings be substituted in their [illegible] reason for removing any of the coverings of the [illegible]t, is, that the evaporation of the moisture produces [illegible] is apt to be transmitted to the patient, and to pro- [illegible] which has already been said to arise from his [illegible] exposed to too great a degree of cold.---The cold thus [illegible] apt to act more forcibly upon particular parts of the [illegible] not usually been accustomed to exposure to cold; [illegible] much more hurtful.

[illegible]rto m[illegible]e been proposed to prevent the patient's be- [illegible] much expos[illegible] cold; (either of the air of the atmosphere, [illegible] s[illegible]nces surrounding him).---The next thing to be [illegible] to avoid *too great a degree of heat;* (either in [illegible]here [illegible]d substances surrounding the patient.) [illegible]eed is a ma[illegible] much greater difficulty to give direc- [illegible] and especially for the author, who has always practised [illegible]pe[illegible] and cold countries; (particularly as few or no attempts [illegible]een made in warmer climates to give coolness to the atmosphere and the substances surrounding the patient). He can therefore only conjecture by what means this object may be obtained.---Even in the climate of England, the atmosphere is sometimes heated to a greater degree than is convenient in fevers, (as has already been shown). The only way of cooling it, that can at all be put in practice, is by the evaporation of watery fluids; which may be produced by sprinkling water upon the floor and other parts of the bed chamber of the patient [provided they be clean.]---But then there is danger of the evaporation producing at times too great a degree of cold, or partial cold. The effects of this are somewhat obviated by using (instead of pure water) water impregnated with the essential oil of aromatic plants: (The author, however, has not much dependence on this, although it feels very refreshing to the patient.)

Whenever the patient is in a climate, whose heat is less than ninety seven degrees of Fahrenheit's thermometer, (which is nearly the heat of the body of the patient,) removing the air in immediate contact, by putting the atmosphere in motion by any kind of *fan;* renders the air which is in immediate contact with the body much colder than it otherwise would be.—Such means, in case of too warm an atmosphere, seem to be very proper to be employed.

It is a *question*, whether exposure to a *stream of air* colder than the heat of the human body, would be safe ?—Certainly if that stream of air contains moisture, it would do mischief; in consequence of the particles of water (which were before suspended in the air) being dissolved in it by the superior heat of the body itself; and thus producing cold in too great a degree.—If the air however passing over the patient under these circumstances, had no water suspended in it ; the author does not apprehend any mischief ; (excepting there was moisture immediately covering the skin : which being dissolved in such dry air, might produce too great a degree of cold.)

The solid substances covering the patient, in case of his being in too warm an atmosphere, ought to be thin ; but still however, they should be bad conductors of heat, (such as cotton wove thin) : for if these should happen to get moist, and they were good conductors of heat, the cold generated by the solution of such moisture in the air, being immediately applied to the patient, might do a great deal of mischief (as has already been explained).

In fever, a patient should avoid all *extraordinary exertions*.---He should be placed therefore horizontally in his bed, or as nearly so as he is accustomed to be when in health. In this position he is supported every where by the bed ; and is not obliged to exert any of his muscles, (as he is when in an upright posture,) to keep the parts in equilibrium.

At the same time, great care should be taken, that his *mind* be kept free from all exertions whatever ; and especially all such as produce any anxiety.---In regular continued fever, when severe, the patient is not able to judge of any thing truly : The mind cannot arrange the arguments on each side of a question, so as to draw from them any perfect conclusion ; much less can it form a rule for any action : nor, when it has formed one, can it imagine the mode in which the effect is to be produced. No advantage can, therefore, be gained by exciting the patient's attention to his affairs : and the force of the system is only exhausted by fruitless attempts.---If a regular continued fever should even be less violent in its beginning, so that a man might then attend to his affairs with some effect ; yet any advantage gained thereby would be much overbalanced by imprudently exerting the force of the system.---As soon, therefore, as a patient is seized with a febrile attack, he should immediately be put to bed ; and left under the care of one attendant only : and every thing that can call the operations of the mind into action is to be avoided.---It might be conceived, that the practitioner, who was called in to attend the patient, need not be warned to avoid exciting anxiety in the mind of the patient about his disease: the hint however is necessary; as there are many practitioners, who (from inattention) make the disease the subject of their conversation, in the hearing of the patient. It has even been affirmed (by those who wish to vilify medicine,) that there are practitioners who, out of a point of vanity, talk learnedly to the patient about his disease; and that there are some who have even wished, by alarming the patient, to fix the disease, and prevent it from being carried off. That this is true, the author can hardly believe: he only intends to warn all practitioners not to disturb the mind of a patient at any time in disease, but more particularly in fever.

The patient being laid in bed, in a posture nearly horizontal, with a proper degree of heat and covering; the next thing to be attended to is, the *quality of the atmosphere* which he breathes and also of that which surrounds him.---It is necessary, as has already been observed, that a man should take into his lungs a certain quantity of a vapor, called pure air; (which has a certain effect on the system, necessary for life). This vapor does not affect the matter of the body, in a way manifest to the senses; excepting that it adds yellow to the red particles of the blood; (which is always so altered in the circulation through the body, that it must pass back into the lungs, in order that a man should exist.)---This vapor makes about a fourth part of the atmosphere.---The whole atmosphere is so mixed together by the currents which constantly occur in it, that pure air is found nearly in equal proportions in almost all situations; at least where the atmosphere does not stagnate: (being the same in this respect, in a room in a private house; in the ward of an hospital in the centre of a city like London; in a cultivated or uncultivated country; or over the sea; or indeed in any situation where currents of the atmosphere constantly take place.)---In order, therefore, to keep up the due proportion of pure air in the bed chmber of a patient, it is merely necessary that the air should not stagnate.

The next thing to be considered is, whether a *different proportion of pure air* would better suit the respiration of a patient in fever, than that proportion which is usually in the atmosphere.---

It is but lately that the proportion of pure air to the other vapors in the atmosphere has been found out; (it having been long known, however, that there were various other vapors mixed with it in the atmosphere).---Whenever any new and seemingly important fact has been discovered, (and especially if it cannot immediately be applied to any advantageous purpose in mechanical or chemical arts,) mankind in general, and very often even practitioners in medicine, conceive it must be applicable to some medicinal purpose. (Just as an infant, when allured by any thing which glitters in its eye, applies it to its mouth, supposing it must be likewise exquisite food; so infants in medicine are dazzled with any surprising discovery, and immediately employ it for the cure of diseases.) They do not consider how extremely difficult an art medicine is; how fallacious experiments made in it often are (as has been observed long ago by Hippocrates); and by what slow degrees valuable medicines have had their powers investigated; (as for example, how long it was before the effects of the bark of the cinchona, and of mercury and antimony, were brought to light: so far as they are already known).---The author therefore conceives, that in fever it certainly is not at all known, whether the fever will go through its ordinary course better or worse for the patient's breathing an atmosphere having a larger or less *proportion* of pure air.---The other vapors constituting the remaining three fourths of the atmosphere, may some of them be noxious; and others of them may be breathed along with the proper proportion of pure air, without detriment.

As the vapors which constitute the atmosphere are extremely *viscid*, they suspend innumerable fine particles of various solids; and also innumerable drops of fluids, which are principally water, (the effects of which last have already been attended to).---Many such substances may be very noxious and very improper for the patient to breathe in health, and be still more noxious in disease.---That they are very noxious in many diseases, is easily seen from what happens in hospitals; (as for example, in almost all kinds of wounds and ulcers, inflammations and suppurations, and in all affections of any of the parts employed in respiration.) In all these diseases the patients in hospitals recover much more seldom, than in the air even of London; (a town at least seven miles long and three in breadth:) and in such a town these diseases go on much worse than they do in the country, at the distance of ten miles from it.

it are noxious particles, or vapors, mixed with the atmos-
r, which nder it so hurtful in these diseases; has not been in-
ated -- e breath arising from the lungs of animals, the va-
from their bodies, the vapor arising from the im-
qu of matter which is constantly putrefying, the vapor
s served for the inflammation of fuel, &c. are all improper
ation. The particles of soot, ashes, horse dung, gravel,
st va ty of other bodies, floating in the air of a large town,
it un btedly improper for respiration :---but which of all
small particles, vapors, fluids, or solids, are hurtful in the *dis-*
which have been e rated; has by no means been investi-
y experiment, (the only means of investigation which can in
st be depended upon).

ever noxious these vapors may be, which ordinarily contam-
the atmosphere of an hospital or large town, in the diseases
e been enumerated;---they do not seem to have very bad
n a regular continued fever. A patient in a regular contin-
er, goes through its course (under exactly the same treatment)
in St. Thomas's hospital; as he does in the country, or in
n which no noxious particles are known to exist.---It is un-
btedly true, that vapor arising from putrid substances depresses the strength; and in so far must be noxions in fever: but when care is taken to avoid such putrefaction, and (by a proper circulation) to keep a due proportion of pure air; infectious vapor and most other noxious substances, do not seem (from experience) to have much effect in regular continued fever.

Two things must be observed, therefore, in regulating the air of the room in which the patient is confined in such a fever.---First, that there shall be a *circulation of the air;* (or, in other words, that such a quantity of air shall enter the room and pass out of it, as is sufficient to keep up the proper proportion of pure air). This must be done in such a manner, as that the fresh air passing in shall not flow in a stream over the bed of the patient; lest it do mischief by its temperature.---Secondly, it is necessary that the air shall *not be contaminated by putrescent matters.* It is much better then that the food, (and whatever else is necessary for the patient,) should be prepared in a chamber adjacent to that in which he lies; and that only the attendant upon the patient should be suffered to remain in his room.

A regular continued fever, if it be left to pursue its own course, continues (as has already been said) for between two and three weeks; if the patient is not lost, or if no crisis takes place. A man cannot live for so long a time without some nourishment.---It is therefore necessary, in the next place, to inquire *what food and drink* should be employed during the progress of the disease.

In the *first place* it is to be observed, that in a regular continued fever, there is no time in which the patient is free from the disease, (as there is in a regular tertian): and therefore those rules, which have been laid down as proper to be followed in a regular tertian, are by no means applicable in a regular continued fever.---In a regular continued fever, *no principal meal* can ever be employed; (as the organs of digestion are always too much deranged, to be capable of converting a large quantity of food of any kind into chyle and blood).---On the other hand, there is this great difficulty in the ordinary state of the body in health; namely, that in man, any interruption to the process of digestion, arising from fresh matter being thrown into the stomach, always interrupts the process, so as to render it much more imperfect; and often induces disorder of the whole system. (This nevertheless is not the case in all animals; for a horse is constantly throwing in fresh matter, and the processes notwithstanding are going on very perfectly).---A man however is often so far deranged in fever, as to render it in many things necessary to deviate from his ordinary modes of life in health. In a regular continued fever, for instance; the food cannot be thrown into the stomach in great quantity at once; without greatly disordering the whole system, increasing the disease, and rendering it irregular. Small quantities only must therefore be thrown in at a time; and this must be often repeated.

In a regular continued fever, be it ever so slight, *no solid animal food* ought ever to be employed; (whether quadrupeds, birds, reptiles, or insects).---Solid animal food, during its digestion, in a regular continued fever, greatly increases the heat to the feel of the patient; still more to the feel of the by-stander; and frequently (though not always) to the thermometer. It produces great restlessness and sense of uneasiness, and an increase of depression of strength, during the time it remains in the stomach and intestines.—It totally deranges the fever; and often produces the appearance of a fresh paroxysm. If it be made use of about noon, or before the next evening exacerbation; this is almost always rendered more violent.---It is true, indeed, that if an error be committed by employing solid animal food; yet after it has once passed through the intestinal canals, the system generally *recovers* itself; the patient being only weakened by the extraordinary exertion, and rendered less able to support himself during the remainder of the disease. But if this kind of food be *persisted in*, it increases the evening exacerbations extremely; brings on delirium much faster, and in a much greater degree than it would otherwise arise; and prevents the fever from being worn out by its own progress, (as it otherwise would be).—All solid animal food is therefore, in *every case*, to be rejected throughout the whole progress of the disease.

Even after the disease has been terminated by a crisis, animal food in a solid state should be rejected; *there being no cause which has produced Relapses*, (as far as the author's observation has gone,) *so frequently as using solid animal food too soon.* Supposing even a complete crisis, should have taken place, and entirely terminated the disease: it ought to be at least *five or six days*, before any solid animal food is ventured upon.---The author wishes to press this more strongly; because, if a perfect crisis should take place, the appetite often returns and the patient is left in a very weak state. It has, in this case, been often conceived by the patient, and much more frequently by the by-standers; that solid animal food would soon restore his strength. It must, however, be remembered, that when a complete crisis takes place, and carries off the fever entirely; the depression of strength (which was a symptom of the fever) ceases; and the weakness, which was produced by the exertions and derangement of all the faculties in the system, is no longer increasing; and that the patient, with very moderate nourishment, and with the sleep and rest so apt to ensue after the fever has been completely carried off; will have his strength restored in a very short time;---without using any thing that shall run any risk of re-producing the disease.

The same objections arise against the use of such animal fluids as *are coagulated by the coagulating juice of the stomach;* (such as serum, eggs, and other fluids of the same kind).---These become solid as soon as they are thrown into the stomach; and have the *same* effects in disturbing the whole system, during their digestion, as have been just enumerated to be produced by solid animal food.

---*Milk* is a fluid of this kind; (being coagulated by the coagulating juice of the stomach as soon as thrown into it): and it has been reprobated by Hippocrates, and many other practitioners. This subject, however, will be considered more fully hereafter.

All such vegetable substances, as *cabbage, lettuce, green pease, and the like*, are to be rejected; on account of their disposition to run into the vinous and acetous fermentations; which the stomach (having its powers depressed by the fever) is now not strong enough to counteract:---Neither is it able to induce those fermentations which convert the food into chyle.---Chyle is therefore not formed from such food; but a considerable quantity of vapor is extricated during the time these substances remain in the stomach and intestines; distending and producing in them spasmodic contractions.

In the *beginning* of a regular continued fever, *no very great nourishment is required*; (the system being able to support itself for a time, without any thing being thrown in to be formed into chyle and blood.)---In the case of a man in health, whatever quantity of food is thrown in, a certain part only is converted into blood: the remainder being either converted principally into water, and thrown out of the body: or into expressed oil, and deposited in the cellular membrane, (or what is by some called the adipose membrane). Hence we see, that where food can always be had in plenty, and the appetite is such as provokes a person to employ a great deal more food than is capable of maintaining the proper quantity of blood; if the superfluous quantity of chyle be converted into *water*, and evacuated; the person remains thin:---Butif on the other hand, a great part of the superfluous quantity of food is converted into *expressed oil*; a great quantity of fat is accumulated in almost every part of the body. When more food is used than is necessary for keeping up the proper quantity of blood; there is always some quantity of expressed oil (and perhaps some other substances) formed in the body. These are *laid up, as it were in a reservoir*; are absorbed and brought into the circulation again; and are converted into blood, and supply in a degree the want of proper nourishment.---*By what process they are converted into blood is not at all known*; but that they are so, is evident; (in as much as a person strong and well nourished, does not lose his fluids and become so emaciated in fever, and in many other diseases; as if he had had less blood in his blood vessels, and less fat, &c. when the disease first took place.---But when a great quantity of expressed oil is deposited in the cellular membrane; it does not better supply the place of food, than if a moderate quantity had been so deposited; (the powers of the body not being able to make above a certain quantity of expressed oil into blood.) Or in other words it may be said, that although a man with a moderate quantity of expressed oil (that is, a man moderately fat,) can undoubtedly support himself in a fever, better than a man who was emaciated when the disease took place; yet a man with a *very large* quantity of expressed oil is hurt by the absorption being increased in consequence of the fever.---(The power of the system is thence oppressed by the quantity of expressed oil absorbed; which not being converted into blood, must be converted into water, to be thrown out of the body.)---When therefore a man is in a proper state of nourishment when a fever begins, (since in his body there is matter which may in part supply the loss of the blood during its progress); it is not [illegible] to disturb the sy[illegible]em, by exhibiting any kind of food liable to [illegible] this effect, in [illegible] first days of this disease.

If it could be fore[illegible] eve[illegible]gins, (as it may be in many cases,) that it would [illegible] *regular intermittent*, in a few days; it would n[illegible] nece[illegible] to derange the system, by exhibiting any kind of food that might produce any disorder in it; (such derangement preventing perfect intermissions from taking place).---But if it be known, (from the rules that have already been laid down,) that the disease is more likely to be a *continued* fever; although no nourishment is wanted immediately, there will afterwards come a time when a much greater quantity of nourishment will be required. The derangement of the organs of digestion also is not so great in the first days of the disease, as it comes to be afterwards; so that upon the whole, considering what may happen afterwards, (that is to say, how much nourishment will be wanted,) it is better not to let the patient sink; but to give him as much food and such food, from the beginning, as will not produce disturbance.

Every kind of food which is *adhesive to the stomach* when it gets into it, produces considerable disturbances in the system during the time it remains in the stomach; (such as a strong solution of gum arabic, and jellies formed from the meat of young animals, or from the membraneous parts of animals dissolved in water): such substances, therefore, should be avoided.---*Farinaceous* matter, coagulated by heat and afterwards dissolved in water, forms a food, which gives indeed moderate nourishment; but then it is *not adhesive* to the stomach; does not produce any disturbance in the system, in consequence of solidity; nor is it apt to fall into the vinous or acetous fermentation, (and is not therefore acescent or flatulent). Farinaceous vegetable food, if dissolved in water, without being *first coagulated by heat or otherwise*, affords a very viscid solution; which adheres to the stomach; and produces great disturbances in the system.--We have seen that the ancient Greek physicians were extremely careful to coagulate farinaceous matter before they exhibited it to their patients, either in a solid form or dissolved in water; as [in] their *panis biscoctus*, or bread twice baked; (the coagulation not penetrating sufficiently through the whole of it on its first exposure to heat). On the same ground they broke down the farinaceous seeds of wheat and other grains, into small particles, (although not quite into flour;) and exposed them to heat in an oven until they were browned.---So likewise *barley water* is prepared, by boiling in the first place the barley in water, till it be coagulated; throwing away that water; and then employing fresh water, by which part of the barley shall be dissolved. Such a solution of farinaceous matter in water, forms the simplest nourishment in fevers and other acute diseases.---Solutions of farinaceous seeds, thus prepared, (first by taking off the husks from the seed, then boiling the cotyledons or farinaceous parts in water, afterwards throwing away that water, and lastly adding more water, until a part or the whole of the farinaceous residue is *dissolved;)* form that kind of nourishment which gives the least disturbance during its digestion.---It has been contended by *many* practitioners, that *no other food* should ever be employed in a regular continued fever; as they have thought that it is of much more consequence to avoid all disturbance, and consequent irregularity of the fever; than to give nourishment in a greater degree. *Others*, again, have thought it of consequence to give more nourishment.

The next preparation of farinaceous matter is made by forming it into a *cake*, baking it, and afterwards boiling it in water until it is not quite dissolved; and so exhibiting it to the patient. *(Sago seems to be the farinaceous pith of some palm tree, prepared in this manner.)*.

The author, in his *Treatise on Digestion*, has shown (by an accurate experiment,) that the same quantity of the same food in a *solid form*, gives much greater nourishment, than when it is *dissolved in* matter; at the same time it is not improbable, that even when it is merely dissolved, it is of somewhat more difficult digestion than when the dissolution is complete.

Next to food prepared in the manner which has been already described; the [illegible] of *farinaceous seeds* (as of barley, for example,) boiled in water, until they have become very soft; give somewhat greater nourishment; and have been thought by many to constitute a food of quite as difficult digestion, as ought ever to be employed in continued fevers.—Bread twice baked (which in our language is called rusk,) is nearly of the same degree of facility of digestion; and of the same nourishment.—Farinaceous seeds, broken down into small particles and afterwards exposed to heat until they are brown; and given either in that state or boiled in water; appear to have been much employed by the ancient Greek physicians: although they are not now in use.

FRUITS are of various qualities with regard to digestion and nourishment.—Some of them contain a very considerable quantity of an acid; which is evidently capable of [illegible]tion, as it corrects the putrescency of animal food; (which no other acid does): showing that it enters into the fermentations of the stomach along with animal food.—This is a subject, however, which it would be improper to argue here; since fruits, whose juices principally consist in this acid (such as lemons,) do not afford nourishment enough to be depended upon in fevers.

Some fruits contain a *mucilaginous* substance, which is itself exceedingly apt to fall into fermentation;—and also to produce in the sugar which in some quantity) is found in all fruits, the vinous and acetous fermentations: and thus to induce these fermentations in the stomach. These fruits are therefore flatulent and acescent; and of consequence cannot be employed with any propriety in this disease. (Cherries, for example, are of this kind.)

Other fruits which contain a great deal of sugar and hence afford great nourishment, and but *little* of that mucilage which is so apt to fall into fermentations: are easy of digestion: and may therefore be employed in fever. The principal of these which are cultivated; are *grapes, figs, and dates*; which are all of them agreeable to the stomach: and may be employed along with the preparations of farinaceous matter, which have been above enumerated.—While in their *recent* form however, the fruits last mentioned contain rather too large a quantity of *essential oil*, to be agreeable to the stomach during the time of a regular continued fever; (although the flavor of this essential oil is often very agreeable to a man in health). They also contain more or less of a *mucilaginous adhesive* matter.---By *drying* or by exposing them to the heat of *boiling water*, the adhesive matter is coagulated, and loses its adhesiveness; the essential oil is in a great measure evaporated; and the objections arising from these sources are of consequence got rid of.---The mischief however arising from their *flavor* and from their *adhesive mucilage*, is *not* so great as to prevent them from being employed, when recent; should they be good of their kind (and especially grapes); provided they be fully ripe.

Another class of fruits contains (besides native vegetable acid,) fermentable mucilage, sugar, and generally a small proportion of an adhesive mucilage like gum, with a quantity of farinaceous matter; ---and such are *apples, pears, apricots, peaches, and nectarines.*---In the tribe of apples there is a large proportion of farinaceous matter and adhesive mucilage; and therefore apples and pears may be employed in regular continued fevers; but not unless they have had their mucilaginous substances coagulated by heat; which also destroys (in a great measure) the fermentable mucilage with which they likewise abound. Boiled, baked, or roasted, they may therefore be employed as food, in a regular continued fever.

Peaches, and other fruits of the same kind, (when they have been improved by *cultivation)* contain little else but farinaceous matter and sugar, [in addition to water]; and may therefore be employed without any previous preparation.

The fruits of the *cucurbitaceæ* (whether ripe or unripe) are very unfit to be given in regular continued fever; or indeed in any disease, where it is necessary to employ food of easy digestion.---They contain a mucilage, which falls into fermentations with more difficulty, than any substance that we know. They resist so strongly the fermentations which take place in the stomach, (although themselves of a loose and flabby texture;) as to have remained in the stomach above three days; and to have them thrown up again undissolved and almost unaltered,---Of this kind are cucumbers, melons, &c.

These are the vegetable substances employed for food, with the properties which render them fit or unfit to be made use of, in regular continued fever, according to the *degree* of the disease.---That is, in a *very violent* regular continued fever, at the beginning, if the patient be in perfect health and strength, and well nourished; nothing but solutions of farinaceous matter, *coagulated by heat*, should be given.—If the fever is *not* so violent, although there appear to be no necessity for much nourishment at the moment; yet, as there will come a time afterwards when the fever will be more violent and affect the organs of digestion more, it is proper to employ farinaceous matter coagulated, and nearly dissolved again in water, (such as sago); or only somewhat softened again by the water, (as barley boiled soft, &c.); together with such *Fruits* as have been above pointed out.

It has been a question, whether any *Animal Food* should ever be employed in regular continued fevers; many practitioners having contended strongly, that no animal food should ever be given.---Animal food (of any kind) is certainly much more apt to disagree with the stomach, to produce a great sense of heat throughout the system, and to render the pulse more frequent; than those vegetable substances which have been enumerated as proper to be employed in regular continued fever. Moreover men may live and be nourished, and their strength be perfectly kept up, by vegetable food alone; (even when they undergo great labor, or use violent exercise).---If thus in *health*, food of easy digestion is sufficient to maintain the powers of the body; it is certainly capable of maintaining them in *disease;* (where from the facility of its digestion, a greater proportion of it will be converted into chyle, than of animal food of much more difficult digestion).

Whether it be ever proper for mankind to use *animal* food, is a question foreign from the present dissertation: The present question being, whether animal food should be employed by a patient afflicted with fever.---The author is inclined to think, that it is never necessary or proper for the patient to use animal food of any kind in a regular continued fever.---But the habit in England of using animal food (in a large proportion to the whole) has induced an idea; that a patient could not be sustained through a regular continued fever without using animal food. This prejudice is so strong, that it is impossible to prevent the attendants on the sick from giving them animal food.---It must therefore be considered, what kind of animal food will produce the least disturbance in the system.-

In the first place, no *solid* animal food should ever be exhibited to a patient affected with a regular continued fever.---Solid animal food (even such as is of the easiest digestion, as fowls; and white fish of a moderate degree of firmness, as whitings;) has been the cause of the greatest number of *relapses*, when used after a crisis or by a convalescent; that have come within the knowledge of the author.---Of consequence, it must do much mischief during the time of a regular continued fever, by rendering the relaxations more imperfect, and the exacerbations more violent: and ought therefore by no means to be used, until the patient becomes perfectly free from all appearances of the disease.

If animal food then is to be employed at all, it should be in *solution in water*:---but all solutions of animal food in water, are not of the same kind.—In the first place, there are certain solutions of animal food in water, which contain *mucilaginous* matter, which *coagulates* (that is to say, becomes *insoluble in water*); and consequently is made solid, as soon as it gets into the stomach.---Such substances when they are thrown into the stomach are as difficult of digestion as solid animal food; and ought therefore to be rejected; (such as whites of eggs, serum of blood, &c.)---Such substances may in general be easily *known*, by heating them to the heat of boiling water; in which degree they coagulate.

Milk however is a fluid which always coagulates in the *stomach*; but does not coagulate in the heat of *boiling water*.---It has been generally thought, that this fluid ought not to be made use of in continued fevers. (In one part of the works of Hippocrates, it is said simply, that it is bad: in another, that it ought not to be given; unless the fever is very long.)---Sometimes the author has seen it coagulate in the stomach so firmly, as to render the patient sick; the sickness bringing on vomiting, during which coagulum was thrown up, resembling a tendon.---In such cases milk is undoubtedly a very improper food.-- Milk consists of a solution of a mucilaginous substance in water, expressed oil, and sugar; and there is perhaps likewise in it a little of the neutral salts of the blood. The sugar contained in it corrects any putrescency that might take place in the chyle, (rather disposing it to be acescent); and the expressed oil (being every where mixed with it) prevents it, when it coagulates, from forming a very firm mass; so that although it be always coagulated in the stomachs of *children*, it digests easier than almost any kind of food, at the same time that it gives them greater nourishment.—This would tempt us to employ it in fever, at least as an animal food of easy digestion; and the author is not certain (notwithstanding it has been condemned by Hippocrates, and notwithstanding a few cases where he has seen it disagree with the stomach,) that it is not fit to be employed, where animal food is given.*

Of the solutions of animal mucilages in water, which are *not coagulable* by the juices of the stomach; there are none found commonly in animal bodies, which give nourishment. They are made by dissolving the solid or coagulated fluids of animals in water, by heat.—These differ from each other, in forming with water a solution, either more or less viscid or adhesive.—It has already been observed, that every thing adhesive is of extremely difficult digestion; and at the same time produces great disorder in the system during the digestion. All such solutions of animal mucilage in water, as form with the water an adhesive compound; are therefore improper to be employed in fevers.—Such are solutions of all parts of young animals, (as veal, lamb, &c.); and also the solutions of the membranous, tendinous, and ligamentous parts of all animals.—If therefore we employ any animal food in regular continued fevers, it should be solutions of the muscular parts of animals which have attained their full growth, (as of oxen, sheep, fowls, &c.)—In making the solutions of parts of animals in water, (which we call broths and soups,) we extract a quantity of expressed oil. This is fluid in the heat of boiling water; but generally solid in the heat of the atmosphere; and contains the flavor of the animal; (which depends probably on an essential oil diffused through the expressed oil.) When the whole solution is set to cool, this expressed oil rises to the top; and as it cools, becomes solid: and therefore may be *easily strained off*, carrying the flavor along with it;—and this should always be done before it be exhibited to the patient.

At the *beginning* of a regular continued fever, when it has attacked a patient who is in *full vigor and well nourished*; it is certainly improper to employ animal food, in the *first* week of the disease;—and when such food *is* given, it ought to be in small quantities at a time.

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* May not the whey of milk, strained from its curd, sometimes be substituted; using rennet for making it, where vinous materials are improper.—As cream chiefly contains the part of milk forming butter, there are cases where cream and water may be useful.

These are the attentions to be paid to *nourishment* during the continuance of a regular continued fever.

Thirst is often a very distressing symptom of fever: and the opinions of practitioners have differed very much with regard to the quantity, as well as quality, of the fluid to be made use of for drink.

The *ancient* Greek physicians thought it improper that the patient should drink any thing at all, during at least part of the disease; as they conceived that any kind of drink increased the fever, and occasioned greater thirst; even water alone. *Modern* practitioners, (with a view of rendering the blood thinner,) have forced the patient to drink a much larger quantity of water or watery fluids, than he would drink of his own accord.

That the blood is thick, and in consequence obstructs the small vessels in fever; was a doctrine formed by authors, who were not acquainted with the substances of which the blood consists.---They did not know that its most essential parts are red particles, coagulable lymph, and serum; that there is besides these a solution of mucilaginous substance, (similar to that which is formed where putrefaction has taken place); that there is a solution of natron muriatum, ammonia muriata, and ammonia phosphorata; besides other neutral and earthy salts; and that besides all these substances there is also water, (not in a state of chemical combination with any substance, but diffused through them.)---There is therefore a larger quantity of water *already* in the blood-vessels, than is necessary to dissolve or combine with any of their contents.---That it is true that there is water *not* chemically combined, is shewn by this; that when the blood is exposed to some of the fine filters in the body, (such as the pores of the skin or the kidneys,) water is filtered off, sometimes perfectly pure. But filtration being a process which never separates two substances chemically combined; water so filtered off, is not in combination with any of the substances from whence it is filtered.---If more superfluous matter were thrown into the blood than is already in it, it would not render any part of the blood thinner, or more capable of passing through vessels it could not pass through before. The only effect of it would be, that when blood came to a vessel so small, as not to let any other part of the blood pass through; the water would pass through, and leave the other parts of the blood behind. Throwing, therefore, a larger quantity of water into the blood-vessels would not thin any part of the blood, that was too viscid; so as to make it pass through vessels that it could not pass through before (on account of its viscidity).---It is not necessary therefore, to force the patient to drink more water than he chooses, for the purpose of thinning the blood; as no such effect arises from throwing in a larger quantity.---There are *many other arguments*, by which it might be shewn, that drinking more water than the patient is naturally inclined to do from his thirst, in no way alters the chemical properties of the blood; (that is, those properties which distinguish the several parts of it from one another, or from any other substance):---but what we have already urged appears perfectly sufficient.

As it is not necessary or useful to give a quantity of water greater than the patient chooses to drink; so on the other hand, the *not giving a sufficient quantity according to the thirst*, seems to have arisen (as far as can be judged) from that superstition, which has induced mankind to refrain from things agreeable, in order to produce some salutary effect; (just as men think they will go to heaven by not eating animal food for two days in the week).---The author then conceives, that the patient should be allowed to drink as much as he desires.

Another question has been much agitated; namely, whether the drink should be exhibited hot or cold.---The ancient Greek physicians exhibited water in fever, not only cooled to the heat of the atmosphere, but cooled to the freezing point; and they gave such cold water, to the quantity of a quart or two, to be drunk at once. The purpose for which such quantities of very cold water were exhibited, will be taken notice of afterwards. (At present only the ordinary food and drink of the patient are treated of.)-- Some modern practitioners conceive, that cold fluids thrown into the stomach, would render the blood thicker; and would make it produce obstruction. Cold undoubtedly increases the viscidity of all fluids; (as is shewn by a cold fluid passing through a filter much slower than the same fluid when it is hot). But the body is always kept nearly in the same degree of heat;---and probably *one of the uses* of this equal heat is, that there shall be *no alteration of the viscidity of the fluids*, so as to affect the filtrations which are constantly taking place; (by which some of the most important animal functions are performed).---When cold water is thrown into the stomach, the power in the stomach itself of keeping its own temperature, (in common with the other parts of the body,) will prevent the heat of the blood in it from being brought below the ordinary heat of the animal.---The rapidity with which the blood passes through the vessels of the stomach, would hardly allow time for it to be much affected by the heat of water in the stomach. (After a man has put his hand in water even as cold as the freezing point, the author has found blood taken from a *vein* of the arm not cooled below 90°.) If the blood was rendered so thick as to be capable of obstructing the vessels, the vessels of the stomach itself would not escape obstruction: but no mischief arises to the stomach when frozen watery fluids are thrown into it. (Thousands of the inhabitants of London are every day in the practice of eating ice; and we find no mischief arise from throwing it into the stomach in health, nor yet in fever.)---When a vein also is opened, and blood flows from it into a basin; the coagulable lymph separates from the water by which it was dissolved, and becomes solid: But the coagulable lymph becomes solid equally, *whether* the blood be kept in the heat of the human body: or be heated only to the heat of thawing water, which is less; or to the heat of 130° of Fahrenheit's thermometer, which is more, than it can ever be exposed to in the human body.---There is therefore no reason to believe, that cold water thrown into the stomach, (especially in such quantity as the patient chooses to drink,) can make any alteration in the thickness of the blood, by its operation in the stomach. —The author therefore concludes, that as it is of no use to *restrain* the patient from drinking as much as he pleases, or to *compel* him to drink more than he chooses; so it is of no use to prevent him from drinking it to the degree of *heat* that he likes best.*

The next thing to be inquired into is, the *quality* of the watery fluid that is used for drink in continued fevers.

Water is obtained without any artificial process, as it flows out of the bowels of the earth by springs. But in this case it almost always contains some saline substances; (most commonly natron muriatum, or magnesia vitriolata, or both:) and likewise very often a vapor, which was called gas by Van Helmont, (who first discovered it); and since his time fixed air, and by many other names.—When the water passes in a *stream* from the spring, *exposed* to the atmosphere; the gas evaporates, and the *salts are decomposed*; so that in a *river*, (although it may be mixed with earthy matter, which disturbs its transparency,) nothing is found chemically combined with its waters.

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* Is this always correct, as for example, where perspiration has begun; and is there no restriction also as to the quantity to be drank, when the water is cold?

There is a *mode of decomposition of certain salts*, (consisting of an acid and an alkali, called *neutral* salts; of an acid and a metal, called, *metallic* salts; and of an acid and an earth, called *earthy* salts:) which has been taken too little notice of by practitioners in medicine: although it is very often of great importance in the exhibition of medicines.—If a neutral, metallic, or earthy salt, be dissolved in barely as much water as will dissolve it, and be merely exposed to the air; no change will take place: but if this saturated solution be now *diluted* with a considerable quantity of spring, river, or rain water, and stand exposed to the air, the salts will be decomposed.—The neutral salts will first have their alkali converted into magnesia: afterwards the acid will be lost; and the magnesia will then fall to the bottom. In metallic salts, also, the metal falls to the bottom in a calx which is combined with pure air; and that calx is sometimes combined with gas. In earthy salts, the acid again will be lost, and the earth will fall to the bottom.—An easy experiment shews this. Make a saturated solution of cuprum vitriolatum in water, and let it stand in a wine glass exposed to the air of the atmosphere; and it will remain perfectly clear and transparent: But [illegible] drops of this solution into a wine glass (holding two [illegible] of spring, river, or rain water: the liquor will be at first [illegible] transparent; but in less than a minute it will begin to [illegible]; and in less than an hour a blue calx will fall to the bottom. [illegible] happens in mineral waters; when [illegible] salts contained in them, if they [illegible] the water, are decomposed on [illegible] atmosphere.—In like manner, (if we [illegible] antimony in an ounce of spring, river, [illegible] quarter of an ounce, (and of [illegible] antimony,) at the end [illegible] ounce may contain a [illegible] antimony: but the second quarter [illegible] quarter of an ounce still [illegible] almost none at all.

To return from this *digression*;—a person accustomed to any stimulus applied to the organs of the senses, feels an uneasiness if that stimulus be removed, (such as a man feels when the light he has been accustomed to is removed): So *pure water*, applied to the palate is insipid; and gives that disagreeable sensation which has been called mawkishness. Thus the inhabitants of London are fonder of water issuing out of the earth by springs, (containing magnesia vitriolata, and natrum muriatum, and gas;) than distilled water: and from being accustomed to the former, distilled or pure water is disagreeable to their taste.—It seldom happens that a solution of any saline substance, which is not disagreeable to the taste from the salt contained; can do any mischief to a patient affected with regular continued fever: and therefore, whether he drinks pure water alone, or water combined with such salts and such a quantity of gas as is commonly found in springs, is of no consequence.

It has often happened that water has been impregnated with the *essential oils of some of that class of plants*, which in Linnæus's system is called dydynamia gymnospermia, (such as sage, balm, &c.); and been exhibited for drink in fevers.—This practice has arisen from an idea, that increasing the hot fit of fever, by stimulants; would tend to produce a crisis. Although this hypothesis was considered by Sydenham, in this country, as not true; and is given up by practitioners of knowledge in medicine; the practice of giving these infusions has notwithstanding continued from mere habit. This practice seldom does mischief; but it is of no manner of use.—Weak *vinous* fluids are in a state of fermentation; and as substances in a state of fermentation are apt to excite any other fermentation that the same substances are capable of; such are perhaps useful to excite in the stomach the fermentations by which the food is converted into chyle; they are therefore so far perhaps better than pure water. Sydenham accordingly recommends small beer, (a weak vinous fluid, formed from an infusion of malt,) provided it be perfectly in the vinous state; as a drink proper to be employed in continued fever.—*Solutions of farinaceous substances, after they are coagulated*, (such as barley water,) have not only the advantage of making the superfluous water of the blood remain longer in the blood-vessels; so as to carry off more effectually the superfluous saline substances, and putrescent mucilage of the blood: But they likewise afford nourishment of very easy digestion: and are therefore very useful as drink in all fevers in which such nourishment is required. They may be rendered more palatable by mixing a *little acid from any vegetable*, (such as lemons or oranges;) and if it should be more agreeable to the patient, a little sugar likewise; (which last tends to give nourishment.)

When a man is seized with fever, it often happens that before the moment of the fever taking place he felt himself in perfect health.—It may happen therefore, that just before the fever came on, he may have eaten a considerable quantity of food; (which of course could not be digested, converted into chyle, and pass into the blood-vessels: nor would it any how else be emptied out of the primæ viæ; and the powers of digestion being lessened, as well as the other powers of the body, the food would remain in the stomach undigested.) When food remains in the stomach or intestines undigested, it either goes through the vinous and acetous fermentations; or else it putrefies;—and in both cases occasions great disturbance in the system. It produces sometimes uneasiness about the stomach itself; and at first a sense of coldness all over the body; afterwards a sense of heat, or of heat without any preceding coldness; a feel of fulness in the abdomen, with flatulency; frequency of pulse; pain in the forehead; sometimes sickness; and sometimes cutaneous eruptions; or even inflammation about the head. All these derangements ought to be avoided in fever.---The readiest mode of getting clear of these mischiefs is, to employ an *Emetic* to evacuate such substances out of the stomach. If such undigested food should have got into the duodenum or jejunum, an emetic will evacuate these likewise; as is evident from its bringing up a quantity of bile, (which never gets into the stomach in the healthy state of the body).---Supposing that *no food* has been thrown into the stomach for many hours before the fever begins; so that all that has already been thrown in has digested, and the stomach and intestines have been cleared of it entirely: even in this case, most practitioners have considered it as necessary to exhibit an emetic. It may be, that something like the same crust that is formed on the tongue, may also be formed upon the surface of the stomach, and be evacuated by the emetic; or perhaps the patient is relieved so much, by some other effect of the emetic, as to have induced all practitioners to recommend it at the beginning of fever; or even five or six days after the fever has begun, (supposing an emetic has not before been given).—It may be doubted whether the emetic produces relief in all cases, by evacuating something noxious out of the body; or whether the action of the emetic may not give relief to the patient in some *other way*. This is a question which will be agitated hereafter; (when at the same time the quality of the emetic, and the mode of exhibiting it, will be treated of.)

Among the powers of the body which are depressed by fever, the *Peristaltic Motion* of the intestines is one. The intestines in this case do not carry down the undigested part of the food; nor yet the bile, pancreatic juice, nor other substances secreted in them. But any of these substances remaining in the bowels produces a sense of fulness and weight, with uneasiness and restlessness in every part of the body; and augments the fever very considerably.—It becomes necessary on this account to employ some *Laxative* to keep up the peristaltic motion of the intestines; and produce an evacuation every twenty four hours.

At the beginning of a fever there may be undigested food in the intestines, at a time when the patient is better qualified to bear a larger evacuation than afterwards: In this case it is not of much consequence what laxative is employed.—But after the fever has gone on for some time, (especially if the strength of the patient be reduced,) the practitioner should never employ laxatives, which are uncertain in their operation; lest by too large an evacuation taking place, the patient should be very materially hurt.—Purgatives are very far from having one quality in all of them: some act, for example, in much less *time* than others. Such purgatives as neutral salts; or such salts as contain magnesia, combined with an acid; increase the secretions, from the intestines and operate in an hour or two after their exhibition; and their effects are soon over.---Others, as aloes and rhubarb, increase only the peristaltic motion of the intestines; and neither produce so copious an evacuation; nor are they so quick in producing their effects, (very often not operating in less than ten or twelve hours).—Of these *two species of purgatives*, it may be proper to employ such as increase the secretions, and operate quickly, for the *first* time; (because the intestines will thus be quickly evacuated; and the substances contained in them, not be suffered to remain long enough to increase the fever or make it irregular;) *provided* the patient should have a sufficient degree of strength.—If he should be very weak, when attacked by the fever; the risk must not be run even at the beginning, (when his strength is not at all exhausted by the fever itself,) of exhibiting even one dose of such a purgative as neutral salts, &c.: lest large evacuations should be produced by it, and the patient so reduced, as never to have his strength sufficiently recruited to be able to be supported through the disease.

If *one dose of such a purgative as increases the secretions* from the intestines, and produces quick evacuations, be exhibited at the *beginning* of the disease; it is improper to repeat it: (because the want of appetite and even the loathing of food in the patient, prevent him from throwing down such substances as we want to evacuate very quickly or to wash off afterwards).—It is much better to employ such purgatives as increase the *peristaltic motion only;* and for this purpose, cassia, manna, and other such laxatives, together with senna, rhubarb, and sulphur, are to be employed. Although they are longer in their operation, and perhaps even give a little more pain to the patient; their effects are much more limited, (so that they run little risk of weakening by too copious an evacuation); and they also clear the intestines more certainly of what is wanted to be got rid of.

It may be said, that we might fix on some laxative which is preferable, and which ought *always* to be employed; this way being much more simple and determinate.—It is to be observed, however, in the first place, that the constitutions of different patients are often different from each other, and that substances applied to different men have different effects; (so that if one laxative happens not to produce sufficient effect in its ordinary course, it may be supplied by another which can). Moreover, in one situation one laxative may be procured, when another of the same kind cannot.—But the principal ground on which it is necessary to enumerate various laxatives is, the advantage that arises from *mixing several of them together.*—When one laxative is employed alone, and in a sufficient dose; it is apt to produce sickness and pain in the bowels; and is uncertain in the degree of its operation: when several laxatives are mixed together, they are much less apt to produce sickness or pain, and are much more certain in their operation.—This observation is applicable to a variety of different classes of medicine; (but it would be much too great a deviation to enter into any discussion of this subject here.)

Certain purgatives not only affect the stomach and intestines singly, but also produce *considerable effects on the whole system*: rendering the pulse frequent, for instance. Such are jalap, scammony, and many others: and it would be certainly improper to employ any of these to act as laxatives in fever.---When the patient has gone through the first week of the fever, his strength begins to fail; and any great evacuation might bring him so low, that he could not afterwards be easily supported through the remainder of the disease.---It is therefore a question, whether it is proper, after the *first* week, to give him a laxative by the *mouth*.

It happens unfortunately, that medicines *do not operate precisely in the same manner* and in the same degree, every time they are exhibited; although given in the same dose, and under circumstances perfectly similar, (as far as can be judged.) The same purgative, or mixture of purgatives, exhibited to the same person in health at the distance of a *week*, (when such person appears to be exactly in the same state in all circumstances;) will operate often very differently; hardly ever exactly in the same manner. At the first exhibition it shall purge four or five times, with or without much pain; at the second, perhaps twice, and with the reverse proportion of pain; or it shall purge the first time only twice, and the second time three or four times. The action, therefore, of such purgatives is very far from being constantly the same.---It is to be remembered, that it is stated that these doses are given at least *with the interval of a week*: but if two equal doses of the same purgative be exhibited to the same person *with a day's interval*, the first dose generally purges much more than the second.---A laxative medicine thrown into the stomach *after the first week of the disease*, (although given in the same dose which before produced one evacuation in twenty four hours,) may now therefore produce five or six; and may by this means diminish the powers of the system too much: and hence it is to be exhibited with great caution.---If however there were *no other mode* of evacuating feculent matter which has been accumulated, yet the mischief arising from the accumulation is such, that a laxative by the mouth must still be employed; although certainly with caution.

There is, however, another mode of applying purgative or laxative remedies; so as to affect the intestines, increase their peristaltic motion, and occasion their contents to be evacuated, and even add to their secretions.---If purgative medicines are *injected* into the rectum only, or with such force as to throw them up also into the colon; they will operate so as to occasion any feculent matter in them to be evacuated. This mode of applying purgatives or laxatives, differs only from the former in the degree of their operation; and is said to be by *Glyster*.---The question here to be agitated is, whether it may be better or safer to employ purgatives or laxatives, in the latter part of fever, to keep the intestinal canal clear of feculent matter, in *this way*; or by the mouth.

As purgatives thrown from above into the stomach, and passing thence into the intestinal canal, are immediately applied to the excretory ducts of all the glands of the intestines: they of course stimulate all these glands: and if they act by stimulating the glands, and thus by producing a flow of fluids in every part, wash the whole canal clean from beginning to end; they are so far preferable. Since such purgatives likewise as tend to increase the peristaltic motion of the intestines, when thrown into the *stomach*, are applied to the whole internal coat as they pass along; they increase the peristaltic motion through the whole; and so empty the intestines completely.---Purgatives therefore thrown into the stomach, clear the whole intestinal canal, better than glysters.---In the *beginning of fevers*, the food that was not digested remains in the upper part of the intestines; and therefore at the beginning of regular continued fevers, it is better on this ground, to give purgatives by the mouth.

When purgatives are thrown into the rectum and colon, (as they perhaps never rise above the colon;) it is a question whether their influence, (as acting on the rectum or colon,) extends to the ileon or higher: and whether therefore they can clear the inner parts of the intestines.—For the present purpose this need not be argued; for after a fever has continued a week and is regular, if purgative medicines by the mouth have been given to clear the *upper* part in that week, (little food and that only of the easiest digestion, being employed afterwards;) all that is required is to keep the *lower* parts clear of the recrementitious parts of that food, and of the fluids secreted in the intestines. Glysters therefore, after the first week of the disease, seem sufficient to evacuate any noxious matter that may be in the intestines.—It is true that it may often happen (and actually does often happen), that during the first week of a continued fever, the practitioner who has attended to the patient, has not thought of the state of the primæ viæ; but left the patient without one evacuation from the intestines for several days; and that this costiveness continues, or a purging arises (from the feculent matter having putrefied or otherwise become stimulating). In this case purgatives or laxatives must be thrown into the stomach: (But such cases will be treated of more fully in the dissertations on irregular fever).

Glysters have this difference in their action from purgatives, that they are not near so apt to produce a number of very loose evacuations; and so to weaken the patient. As therefore they are sufficient to keep the primæ viæ clear after the first week, [and act with little delay,] they are preferable for the reasons above given.

Nearly the *same substances* used for laxatives given by the mouth may be used for glysters.

The *Vehicle* should be some mucilaginous watery fluid; as a solution of farinaceous matter in water. A solution of the flour of oats, (which we call water gruel,) may be used: and decoctions of mallows, &c. are proper. Such mucilaginous substances are preferable to pure water; as they prevent the stimulus of the purgative from acting so immediately on the intestine; and thus causing the glyster to be evacuated directly, without bringing feculent matter along with it.—It would be too great a digression here to enter into the explanation of this subject: it is sufficient to say, that the effect is actually found to be so.—For the same reason oil has also commonly been added to glysters. Oil has also the effect of smoothing the inside of the intestines; and of allowing hard feculent matters to pass easily over them.

The purgatives to be used in *glysters*, in regular continued fevers, are manna, cassia, &c. ol. ricini, senna, &c.: which do not stimulate the system. It is also much better to mix them together, (as in the elect. sen. comp. and other compositions;) as purgatives given by the mouth are better mixed.---In continued fevers (where glysters are merely used to keep the primæ viæ clear) neutral salts are not so applicable for glysters: being apt to induce a watery secretion from the intestines; which is not wanted, but is hurtful.

If after the first week of a continued fever, the patient should have had no evacuation from the intestines for twenty four hours; a glyster should be used *about six or seven in the evening:* that the feculent matters may be evacuated before the time of sleep.---This should be repeated every evening, when there has been no evacuation in the former part of the day.

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e recruited, crises would be more apt to be produced, and all
ces in the system would be got rid of.

xercise, (whether it be that of labor or for amusement) man
osed to sleep. But in a fever, as the patient can neither labor, nor employ exercise for his amusement ; he ought undoubtedly to be as much at rest as possible both in body and mind ; (the method of procuring sleep by exercise, being here out of the question).

There are some things that induce mankind to sleep, when the powers of the system are not exhausted : as perfect quietness of mind ; freedom from pain and uneasiness in the body ; no passion rousing to exertion ; nor bodily pain strongly drawing the attention ; with every thing that gives constant and pleasant sensation. As an instance of the last case we may reckon among some nations, gently pinching the skin. Gentle motion in the air from the waving of fans ; and the gentle and uniform noise of the flowing of water, or of the wind rustling through trees ; also lull a man to sleep.---Such attention however to uniform and agreeable objects can hardly succeed in releasing the mind from that anxiety, which renders the patient restless in fever. (Something of this kind nevertheless the author once saw successful ; that is, the dropping of water, running slowly through a filter, into a basin of fluid placed below.)

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* A gentle opiate in a clyster of *small bulk*, may here be useful.

Opium is a medicine which has been known to produce sleep, and give rest to those who are fatigued; probably as long as the effect of any medicine has been known. There is some medicine said to have been given by Helen to Telemachus to produce this effect; (which indeed is the only medicine mentioned by Homer as having any effect when exhibited internally:) and opium was certainly well known in the earliest ages in Greece.---In many cases, (as when a man is exhausted by labor or weakened by evacuations,) it procures a quiet, easy, and refreshing sleep, if exhibited in the quantity of from half a grain to a grain.---In regular *continued fever*, if exhibited in this quantity it often produces sleep:---but this sleep is disturbed: the patient is often distracted with various incoherent and frequently disagreeable dreams; and often wakes in the morning with a persuasion that he has not slept at all. Instead of a relaxation of the fever taking place in the morning; his head-ach is greater, he has more thirst, and his appetite is less. Sleep therefore so procured, is so far different from that *Rest*, which gives room for the powers of the body to be recruited; that these powers are more exhausted during such sleep, than they would have been, if the patient had not slept at all.---It is true, there are some cases in continued fevers in which such a restlessness from the opium is not produced; but a quiet, easy, refreshing sleep follows its exhibition. These cases occur when there are irregularities in the disease; (and will be described in a future dissertation).

A great many substances have been *mixed with opium* to render the sleep procured by it more quiet and refreshing; (such as spices, acid of benzoin, preparations of antimony, antispasmodics, and many others;) but no mixture has as yet been found out, which renders such doses as have been described, capable of producing easy and refreshing sleep in regular continued fevers.

About five and twenty years ago there arose a practice in St. Thomas's Hospital of exhibiting *opium in a small quantity:* (to wit in the quantity of a quarter of a grain for a dose;) and repeating it at the end of every six or eight hours. When given in such doses, it produces no immediate effect; but by degrees the patient falls into a stupor which gradually increases: and although this stupor does not end in a complete sleep; yet it grows in a day or two into that kind of stupor that we find, when there is a commencing diminution of that species of delirium from fever, which is attended with apparent fulness of the vessels of the brain.—It is true, indeed, that this dose of opium is obtained by adding a few drops of laudanum to that mixture, which is called [illegible]; but the author has often employed the opium in his private practice, with ten grains of *Castor*, with equal or rather better effect.—Lately, many practitioners have exhibited opium *three or four times in the twenty four hours*, in fevers: having borrowed their practice probably from that which has been pursued in St. Thomas's Hospital; (the practice of this Hospital being open to the inspection of many pupils). These practitioners have not learned however, that it is the smallness of the dose that produces beneficial effects; (for if the dose be increased so far as to half a grain, the same restlessness, the same disturbed sleep, dreams, &c. as above noticed, are brought on.)—*Mithridate, Theriaca Andromachi, &c.* contain an immense mixture of mucilaginous medicines, spices and astringents, with a small quantity of opium. This vast farrago renders their effects totally unintelligible; and they have therefore been thrown aside. But many practitioners have given them up with great reluctance, especially old practitioners. (It may be said, indeed, that a man who has been in the habit of exhibiting any medicine in a disease, does not like to be disturbed in that habit:) But it is not improbable that they have been led to continue the use of these, from the good effects arising from the exhibition of the small doses of opium they contain.

Whether such small doses of opium can with propriety be employed during the *first* week of the fever, has not been determined. The author has not ventured upon employing such: nor does he know that any other person has employed them during the first week of the disease.—It is a question, whether it might be proper to employ opium in the *second* week, notwithstanding there is delirium of either kind in a considerable degree. This question, however, seems to be determined by practice: for in either case of delirium it would appear that it is proper; since it considerably abates the delirium; (and especially takes off that violent increase of delirium of the first species, which arises in the evening).

Opium is not the only medicine which has been employed with a view of procuring sleep.—There are certain medicines which have been called *Antispasmodic;* which have also been employed for the same purpose by many practitioners. (An antispasmodic medicine is a medicine, which takes off any contraction arising without an apparent cause, or continuing after the cause of the contraction has been removed: but this definition by no means has been adhered to.) The medicines which have been more particularly employed to procure sleep in a regular continued fever, and which are ranked among antispasmodic medicines; are ether and oleum vini; and sometimes musk, castor, and camphor. The author has very seldom seen the *three last* procure sleep in this disease;---But a *mixture* of alcohol, ether, and oleum vini, (such as Hoffman strongly recommends under the name of *liquor anodynus*; and which is probably the same as the *spiritus etheris vitriolici compositus* of the London Dispensatory,) the author has seen procure sleep in many instances in regular continued fever. The great drawback from depending on its powers is the *uncertainty* of its operation: for sometimes, given to the quantity of a dram in the evening, it procures a perfectly sound and quiet sleep; or if the like dose be repeated every six hours, sleep takes place at the ordinary hours of rest; (quiet, sound, and refreshing). On the other hand it is to be observed, that its effects in producing sleep are perfectly uncertain; and that the patient is often just as restless after it has been exhibited, as if he had taken no medicine at all: it happens even much more frequently that it does not produce any effect. Moreover, it cannot be distinguished, by any sensible appearance in the patient, in what cases it will produce an effect, or where it will not produce any effect at all.---No bad effects, however, arise from employing it, as far as the author has been able to discern: there is, therefore, no reason for not employing it when the patient is restless and without sleep, (however capricious it may be in having this effect during the disease).

Where a regular continued fever is left to pursue its ordinary course; the efforts that take place in the fever, and the want of sufficient nourishment and sleep; frequently *Weaken* the patient towards the end of the disease to such a degree, as to be dangerous and even in some cases fatal.--It often happens likewise, that this weakness is greatly increased by evacuations, which have been unnecessarily made by injudicious practitioners. Weakness is also induced by evacuations which arise from irregularity in the fever; (and which consequently will become the subject of a future dissertation). Weakness also often takes place for want of food: (first.

from the necessity of withholding food from the patient in sufficient quantity; and next, if the patient should take-in a larger quantity of food, yet from its not being digested and converted into blood, it must either be evacuated without change, or converted into water and carried off by an effort which would still further diminish the force of the system). Weakness may be also produced by not exhibiting that quantity of food that in truth might have been digested; (either from want of skill in the practitioner, or the carelessness of the attendant. What the quantity and quality of food are which ought to be given, has already been described). Weakness may also be induced by practitioners employing medicines that occasion considerable efforts in the system, without diminishing the disease; (although no improper evacuations have been made).

If no unnecessary evacuations have been made; if care has been taken to give food in such quantity and quality as the patient can digest during the progress of the disease; if the patient has not been exhausted by the application of improper medicines;---it rarely happens that such a degree of weakness arises in a regular continued fever, as to endanger the life of the patient.

If such a degree of weakness *should* take place at the end of a regular continued fever, as to endanger the life of the patient; the force of the body may in some degree be kept up, by employing medicines which will induce the powers of the system to act with all their force; until the fever shall so far diminish, as to allow of the stomach digesting food of better nourishment, or of the powers of the body being recruited by sound and refreshing sleep.

The practice of *exciting the body to act* with all its powers, until the fever is far gone off, depends upon the following principle.--- Let a patient ill of a regular continued fever be ever so weak at the time of the crisis, or at the time when the disease has gradually worn itself out; yet as soon as the fever is entirely terminated, (provided the patient is allowed to be perfectly at rest; and provided proper nourishment be exhibited, to wit, such as he can digest;) the powers of the body begin instantly to be on the increase: and the patient will be gradually restored to his health.—Although however there may be considerable power in the system; yet there may be a want of *exertion* of that power: so that the patient may sink and die from weakness, though there be still in the body powers, which if they had been exerted might have kept the patient alive. By employing medicines to make the body exert these powers until the fever is gone off; the patient will be preserved, and afterwards gradually recover his strength.—If this was not the case, all stimulants employed in fever would evidently be extremely hurtful: for every extraordinary exertion tends to weaken the system, and to exhaust the powers that it brings into action; and therefore if all the powers in the body were already in action, the increasing that action would weaken the system much more, and render the weakness more fatal; (instead of preventing the patient from being destroyed by it).—The stimulant employed then must rouse merely the *dormant* powers, in order to have good effects.

The *Medicines which have been employed for making those powers exert themselves* that otherwise would not, are now to be treated of. (The ordinary means of recruiting the strength in health, by nourishment and sleep, have already been attended to; as far as they have an effect in regular continued fevers. With what variation food and sleep are to be managed in a regular tertain, has already also been sufficiently argued: And what attention is to be paid to them in irregular, continued, remitting, and intermitting fevers; will make part of future dissertations.)

The author means then here to take notice of the several different modes that *practitioners* have employed to excite the action of the living power, in regular continued fever; and to give his *own opinion* with regard to them, whatever has been the opinion of other practitioners of whatever estimation.

1st. Many practitioners have endeavoured to excite the Dormant powers of the body (which as the author has just observed, can alone be excited to advantage;) by producing *Inflammation of the Skin* through the application of various stimulants.

If an inflammation is produced in the *Exterior* parts of the body, so as to occasion an alteration in the system generally;—in case it be *Phlegmonous inflammation*; the pulse becomes hard, full, strong and frequent; and there arises an universal sense of heat: but the powers of digestion are impaired; the patient loses his appetite, (so that he cannot swallow so large a quantity of food); the ordinary quantity of food which he makes use of in health and of the ordinary quality, produces sickness and vomiting, or at least great uneasiness and disturbance throughout the whole body; the faculties of the mind cannot be equally exerted, (and especially the imagination and judgment); the muscular powers are also diminished, (since a man cannot go through the same labor;) and the sleep is likewise prevented. Phlegmonous inflammation therefore prevents the body from being recruited by food and sleep; and the muscular powers of the body and the powers of the mind are by means of it considerably depressed.—If an inflammation of the *skin* (that is, an *Erysipelatious inflammation,*) be produced in a man in health, so as to occasion affection of the general system; the pulse becomes much more frequent, (often to one hundred and twenty strokes in a minute, or more); it also becomes smaller and weaker; the strength is generally depressed; and all the powers of the body and mind are in consequence less powerfully exerted.---In a person otherwise in health therefore, neither the inflammation of the substance of the *exterior parts of the body*, nor an inflammation of the *skin*, can increase the powers of the system: on the contrary they diminish the powers of the whole. If it were wished that a man should lift a greater weight; in order to enable him to make such greater exertion, no one would apply a blister to his back, or make a deep and painful wound in any part of his body. (It is true, that we spur a horse to make him run swifter, but the greater exertion in this case is from his endeavor to escape from pain.)---Although then exciting any kind of inflammation by no means increases the force of the body, if it be *in a state of health;* yet in health the actions of applications to any part of the body may have a very different effect from what the same applications would have, if they were made to the body *when diseased.*—Whether exciting inflammation has or has not the same effect in a regular continued fever, which it has in health; can only be known by making these applications to the body of a person affected with regular continued fever.—As far as the author's experience goes, if any stimulus has been employed so as to produce inflammation, when a patient has become weak towards the end of a regular continued fever; the only difference that has occurred has been, that *phlegmonous* inflammatian has not produced hardness, fulness, and strength of the pulse: but *both phlegmonous inflammation and inflammation of the skin* have occasioned greater frequency of the pulse, and have rendered it weaker and smaller, and (as in health) have prevented sleep, and the patient's taking the same quantity of nourishment; and have depressed and deranged the whole system.---The author therefore has concluded, that stimulants applied to the skin so far as to excite inflammation; by producing such inflammation, do not keep up the strength or make any dormant power act; but that on the contrary they weaken the patient: and that therefore exciting inflammation of the skin is *not to be employed with a view to keep up the strength,* when weakness takes place towards the end of a regular continued fever.

When substances nevertheless are applied to the skin so as to excite inflammation; such substances may be *Absorbed,* carried into the general course of the circulation, and be applied *to all the irritable parts* of the body;---and may so act upon some or all of these, as to bring the *dormant* powers of the body into action: and so may keep up the strength towards the end of a regular continued fever.---It may be worth while therefore to inquire into the effects, which the substances commonly employed to excite inflammation of the exterior parts produce; when they *are* absorbed, get into the general course of circulation, and are applied to the various irritable parts.

The stimulating matter of *Cantharides,* has been very commonly employed to excite inflammation of the skin; and to keep up the strength towards the end of continued fevers.---That this matter is often absorbed there can be no question: for it very frequently (in consequence of being absorbed) produces inflammation of the neck of the bladder, which we call Strangury; and when it produces this effect, the pain and constant sense of uneasiness irritate and exhaust the patient at all times. Every practitioner who has employed cantharides to excite inflammation and attended to their effects, must have observed them often, when absorbed, bringing on subsultus tendinum, convulsions, and hysteric fits; all of which are certainly very far from keeping up the patient's strength in continued fevers. ---In like manner, if we examine any *other stimulant* which has been employed to excite inflammation externally, in order to keep up the strength towards the end of a continued fever; we shall find that when they are absorbed, they produce effects upon the irritable parts of the body, which are not at all conducive to support the strength towards the end of continued fevers.---The author, therefore, is obliged to reject the excitement of inflammation of the exterior parts of the body, as a means of supporting the strength towards the end of continued fever.---He does not say, however, that it may not be proper to excite *external inflammation for other purposes* in regular continued fevers; (but this will be a matter of future consideration).

2. The *next means* of exciting the action of the dormant powers of the body, so as to make them support the strength at the end of a continued fever, when the patient is weak; is the application of *substances which act upon the Stomach itself*; (thence exciting the other parts of the system to exert themselves powerfully.)---The first kind of these to be enumerated is that class of plants, called by Linnæus *Tetradynamia*: together with the several species of *Allium*: and likewise *Ammonia*. These stimulants, when thrown into the stomach, act upon it immediately, long before there is time for them to get into the blood-vessels; their effects go off also *in an hour or two*: and while they produce any effect, it is principally that of making the pulse more frequent, without increasing its strength or fulness. Such stimulants have therefore been rejected from the remedies fit to be employed, in order to make the dormant strength of the system be exerted towards the end of continued fevers.---The *Gums* (as they were formerly called) are resinous substances which exude from vegetables: forming either a pure resin, or a mixture of mucilaginous and resinous matter.---Neither these, nor preparations of *mercury*, seem to act upon the system generally, when they are *immediately* thrown into the stomach; but require *some days* before they produce any effect; being probably absorbed, and applied to the several irritable parts in the system. Of these, mercury is much too apt to produce evacuations to be trusted, (lest such evacuations should weaken the patient much more, and even to that degree as to destroy him): and the resinous substances pointed out have not been so much made use of, as that we can determine the propriety of their exhibition. The author indeed has seen them employed; but if he remembers right, without any great effect.---The *Spices*, (such as cinnamon, nutmegs, cloves, pepper, and cardamoms.) have been very often and very much employed to keep up the strength in continued fever. They are not nearly so much in use at present, as they were about fifty years ago. When they have any sensible effect, they render the pulse much more frequent, smaller, and weaker; and hence are certainly improper.---It is true indeed that by adding a quantity of *Acid* to them, the frequency of the pulse is reduced, and is (in some way) in a certain degree prevented. They are, however, in general very improper rem-

edies for this purpose; except when there is a great deal of flatulency in the primæ viæ, which depresses the strength of the patient; (for flatulency is an effect, which these spices are powerful in relieving.)

Wine seems to be the only remedy that is of use to excite the dormant strength of the system, when weakness takes place towards the end of continued fevers. It tends to increase the force of the system, without increasing the frequency of the action of the heart; and on this ground it may be more safely employed than any other stimulant. It has also a narcotic power.---Wine however should be employed in moderate quantity. When exhibited in large quantity it produces intoxication; the effects of which every man who has drank it in such quantity, very easily perceives. (The stomach, after the intoxication is gone off, is disordered; spasmodic contractions take place in it; and it is not capable of digesting food: which last effect would render the patient weaker, from want of receiving sufficient nourishment.) Wine should be used, therefore, sparingly; and not in the least to intoxicate.---It ought only to be employed, when the weakness has become considerable, and then in moderate quantity: (for if we exhibit it in greater quantity than is sufficient to produce a proper exertion of the dormant strength of the system; it will exhaust that dormant strength; and not leave a sufficient quantity to support the patient during the remaining part of the disease.)---When wine is first employed by persons not accustomed to use it, where it becomes necessary to employ it from weakness; four ounces is a sufficient quantity of wine of the strength of Port wine.---The strength of wines can hardly be transmitted to posterity by any permanent mark; for the strength does not depend merely on the alcohol they contain; but likewise on the quantity of a vapor, which was called by Van Helmont *gas silvestre,* (probably different from that vapor which he called gas simply,) and which has since been called fixed air and carbonic acid; (although the author thinks these improper names; a point however, foreign to the purpose of this dissertation.)---The author has also to observe, that in patients who have been *accustomed to drink wine even in large quantities;* three half pints are quite sufficient to be exhibited in twenty-four hours.---If wine is made use of, it should be well fermented. As it is very rare that weak wines are well fermented, it is better that *strong* wines should be used. Sweet wines are perhaps preferable from the nourishment contained in them: But they are seldom well fermented, except they be very old; and if not well fermented, they are acescent and flatulent.

It has been a question, whether it is better to employ the wine by itself; or *diluted*, with the farinaceous or mucilaginous vegetable substances we employ for nourishment to the patient?---It appears to the author, that they should be diluted with farinaceous or mucilaginous substances, mixed with sugar; as these take off the immediate stimulus with which wine (when strong and pure) is apt to act upon the stomach.---On the same ground the author would perhaps condemn all *distilled spirits;* excepting in some sudden cases of extreme weakness; (such as happen from too copious an evacuation from any excretory organ in the body.)

The author has now shown the means of treating a regular continued fever, supposing it is left to pursue its ordinary course.

The next thing to be inquired into is, whether Means have been found out to *shorten the fever*, by producing a crisis or otherwise; so that the patient shall be restored to health?

This inquiry will lead the author to consider whether *Bleeding*, (either from any vessel in the body indiscriminately, or from some particular vessel in a particular part of the body;) has the power of carrying off the fever:---Also whether *Purging*, or any other evacuation to any degree, has a power of carrying off a regular continued fever:---Whether *exciting inflammation in the skin, or in any other part*, has any power of carrying off a regular continued fever:---Whether Peruvian *bark* (or any other remedy acting on the same principle) has any power of carrying off a regular continued fever:---Whether *stimulants*, such as spices, have any power of carrying off a regular continued fever:---Whether *antispasmodic* remedies have any power of carrying off a regular continued fever:---Whether there be *any* medicine which carries off a regular continued fever, that has *no apparent action* on the body, when in health or when affected with other diseases:---Whether preparations of *antimony or ipecacuanha*, or of those other medicines which have been enumerated in the dissertation on a regular tertian, (as bringing on a crisis similar to that which takes place in fever itself, or which render it more perfect); have any power of carrying off regular continued fevers:—Whether, if symptoms of *putrefaction* of the fluids should arise;

any remedy, and what remedies, may be employed to restore them to their healthy state:—Whether, if *hemorrhage* should arise in consequence of putrefaction; any remedy, and what remedies, may be employed to stop such hæmorrhage:—And lastly, if any of these remedies have a power of carrying off or diminishing a regular contiued fever; *in what manner* they are to be employed for this purpose; and what circumstances may make it *improper to exhibit them?*

These inquiries will form the *second part of this dissertation;* which is in great forwardness.

END OF THE FIRST PART

OF THE

THIRD DISSERTATION.

Note by the Editor, referred to at page 224.

AS continued fevers commence at different hours of the day, the author adopts the following rule for computing the *Days of Fever.*—Continued fevers almost immediately assuming their habit of aggravating their symptoms at 5 or 6 *in each afternoon,* he considers these exacerbations as *fixed points* from which to reckon; holding the first exacerbation as happening in the first *afternoon* of the fever, or in other words as making the *end* of its first day, (whatever be the number of hours which preceded.) His second day terminates with the second exacerbation; and his third, with the third exacerbation; the days of the fever being thus reckoned from *afternoon to afternoon.*

A

THIRD DISSERTATION

ON

FEVER;

PART II.

CONTAINING AN

INQUIRY INTO THE EFFECTS

OF THE

REMEDIES.

WHICH HAVE BEEN EMPLOYED WITH A VIEW TO CARRY OFF A

REGULAR CONTINUED FEVER,

WITHOUT LEAVING IT TO PURSUE ITS ORDINARY COURSE.

—o—

PRINTED IN 1799, IN LONDON.

THIRD DISSERTATION, &c.

PART SECOND.

Having, in the *First* part of this dissertation, pointed out the history of a Regular Continued fever; the accidents that take place in it; and the manner of avoiding these accidents, if it should be *left to pursue its ordinary course;* (excepting one accident, to wit, Putrefaction, which arises but seldom:)---

The author in the *Next* place is to take into consideration the ***REMEDIES*** by which the fever may be *carried off;*---so as to leave the patient in health in a shorter time;---or to conduct him through with *less danger*, than if the fever had been left to pursue its ordinary course.

Since (as has been already observed) the essence of fever, or the state in which the system in fever differs from the healthy state, is altogether unknown:---the effects of medicines also in removing that state, can only be known by observation or experiment; (there being no remedy that has any property, either chemical or mechanical, or any operation, when given to a man in health; that can point out any ground for employing it to carry off this disease.)

The author now therefore comes to show *What Remedies* have been employed by practitioners, *to carry off regular continued fevers;* (whether they have been employed in consequence of some hypothesis, or have been found out by mere accident.)

1st. The first remedy to be considered is, opening a vein in the arm, or indiscriminately in any other part of the body; and letting a quantity of *blood flow out.*

Authors and practitioners have *confounded fever* (such as the author has defined it) *with many other diseases;* particularly with all diseases in which the pulse is to a certain degree *frequent.*---Many diseases, in which the pulse is frequent to a certain degree, differ from one another in almost every other respect. The pulse is frequent to upwards of a hundred strokes in a minute in pleurisy; it is often frequent to above a hundred strokes in a minute in gangrene and mortification: but pleurisy, and gangrene and mortification, are very different diseases; and require treatments totally different. In pleurisy, taking away large quantities of blood is one of the most powerful remedies for carrying off the disease; whereas in gangrene and mortification, taking away large quantities of blood would be the most effectual means of destroying the patient. In gangrene and mortification also, the best mode of putting a stop to the disease, is to exhibit the bark of the cinchona in large quantities, with wine and spices; whereas in pleurisy, exhibiting large quantities of the bark of cinchona, with wine and spices, would be the surest way of increasing and rendering the pleurisy fatal.---Certainly therefore diseases in which the pulse is frequent, may differ from each other in all things, excepting mere frequency of the pulse; which yet *Dr. Boerhaave* makes a specific mark of fever. (It is to be observed, that when Boerhaave gave this definition, he had never seen a fever; having studied theology, and not medicine.) It has been shewn likewise, that the pulse in fever is by no means always frequent; and that therefore *frequency* of the pulse can by no means be considered as a pathognomonic symptom of fever.

If all diseases, in which the pulse is frequent, be confounded together and called fever; it certainly cannot be said that taking away blood never cures the disease. But if the disease, which the author has endeavored to define, as fever, be *alone* meant; the taking blood from a large vein, (in any part of the body indiscriminately,) never diminished, shortened, nor carried off a fever in any case he has seen; nor has he found any upon record in which it had this effect. ---It is true that an *Accident*, (such as General Inflammation,*) may happen in an irregular fever, capable of destroying the patient; which accident may be counteracted and prevented from doing mischief by taking blood from the arm, or any other part indiscriminately; (as will be described when such irregularity is treated of.) The accident being removed, the fever may afterwards continue its course, may terminate by a crisis, or wear itself out; as if no such accident had taken place.

The author having affirmed that taking away blood from the arm, or from any large vein, neither increases nor diminishes a fever, nor alters its course, *as far as he has seen*;—he next comes to consider *what might be expected* from taking away a quantity of blood indiscriminately from any blood-vessel during a fever.—A quantity of blood flowing out of the body, (whether it be taken on purpose or by any accident,) occasions weakness. If the blood continues to flow, the weakness will increase: so as to render the body incapable of performing any function or action whatever; and in consequence will kill. If it does not continue to flow, it yet weakens a man: and the weakness continues until the blood is reproduced by the digestion of food of proper nourishment: or perhaps by the conversion of expressed oil or other substances deposited in the body, into new blood.---This weakness, with the accidents that arise from it, are *the only effects of the loss of blood which are perceivable.*—As fever takes place equally in a strong and a weak man; it is also equally violent (as far as regards the fever itself,) in a weak man as in a strong man; and it is apter, or at least as apt, to run out to a great length in a weak man, as in a strong man.---It is not, therefore, *a priori*, at all probable, that weakening a man should diminish or shorten a fever.

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* See *General Inflammation* defined in Dissertation fourth.

It comes then to be inquired into, *why* taking away blood indiscriminately from any large vein has been so often practised in fevers, even by practitioners of the first rank in medicine?—The author can only refer this practice to the impatience with which mankind bear any evil; and to that superstition which predominates in them. If any violent disease takes place, men immediately recur to some violent remedy:—But their recurring through *impatience* to some very violent remedy, is no proof, that such remedy is useful. If, a man who has gone upon a journey, should return and without previous notice find his house burnt down, his family and property destroyed, and his friends ruined; he would be apt to stamp upon the ground, beat his breast, and tear his hair: but stamping upon the ground would not rebuild his house, nor would beating his breast restore his family and property, nor tearing his hair retrieve his friends. As it is mere *Impatience* which makes him have recourse to these violencies; so mere impatience makes mankind have recourse to violent remedies in diseases; although no experience has shewn that they are of any use in the disease for which they have been employed. (To this argument the author will have occasion to recur. when he comes to treat of irregular intermittents in a future Dissertation.)—So in like manner it is often from *Superstition* that such violent remedies, and especially blood-letting, have been employed. Mankind are exceedingly apt to believe, that refraining from some gratification is agreeable to the Almighty, or to the gods which their imaginations have created; even if they enjoy that gratification without any injury to their own health or constitution, or without injury to their fellow creatures or any animal whatever, or without hurt to their moral character. Some pretended teachers of religion have gone so far as to refuse to their disciples, when dying of so distressing a disease as pulmonary consumption; the gratification of enjoying the cheerful warmth of the sunshine. Under this or some very similar idea, men have thought that their gods would be content with one part of the body, to save the whole: whence among many rude nations, a finger or toe is cut off or a tooth or two knocked out; in order that the rest of the body may be left safe.---Blood likewise has attracted the attention of mankind by its intense red color, and because the loss of it (as has already been said) in a certain quantity, is fatal; whence the losing a quantity of blood, has become the object of their superstition. Losing blood has been looked upon as the greatest distinction that could be made in the most solemn ceremonies; and men as the mark of the greatest bond of secrecy and steadiness, have signed contracts with their blood.--Taking away therefore a quantity of blood has been thought a sacrifice the most powerful for carrying off a disease; (and for carrying off fever, as one of the most violent and fatal of diseases.)---The author does not mean to say that every practitioner, who bleeds constantly at the beginning of a regular continued fever, has these ideas in his mind. The greatest number of practitioners follow the practice of those who went before them; without examining from whence that practice has arisen, or upon what ground it is founded.—From this view of the subject it may perhaps appear, why blood-letting has come into practice in the beginning of all regular continued fevers.*— Practitioners also have not compared cases of fevers in which it has been practised, and cases of fevers (treated in other respects in the same manner) in which it has not been practised.

The author having said, that taking away a quantity of blood from any large vein indiscriminately, in any part of the body, neither increases, diminishes, nor shortens a regular continued fever:---the next inquiry is, whether any *Mischief* may arise in a regular continued fever from taking away a quantity of blood?

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* Early practitioners have been governed first by accidents, and then by systems; the lancet having been little used by very barbarous nations.

The author has already shown, that a patient afflicted with regular continued fever cannot digest his ordinary quantity of food; that therefore the fluids (which are constantly wasting) cannot be recruited; and that the system must be weakened: that in a regular continued fever there are constant exertions which likewise debilitate: that the repose which takes place in sleep is necessary to restore the living power; but that sleep being prevented in fever, the living power is not recruited: and that in consequence of all these causes of weakness the patient is actually so debilitated, as to be destroyed in many instances.---The farther *Debility* therefore arising from emptying the vessels by taking away a quantity of blood, is often such, as to destroy the patient in the remaining part of the disease.---Patients in consequence have very often been cut off, when blood has been taken indiscriminately from any large vein at the beginning of the disease; as the author has seen in a great many cases. (*In the first part of the author's practice,* the Boerhaavian doctrine prevailed; which induced practitioners to take blood from the patient in *all* cases of fever; so that the author has had occasion frequently to *see the effects of this practice.)*

The author having said, that the *Essence* of the disease is not at all known; it follows hence, that it cannot be said *a priori,* whether any particular remedy will be of use in shortening or entirely carrying off fever.---Taking away *blood from the vessels of the head* has, indeed in some cases, immediately carried off fever;---and it has also tended to diminish that species of delirium accompanied with fulness of the vessels of the head, even when it does not shorten the disease:---But the first of these effects will be considered in a Dissertation on the irregularities of fever: and the second in a future part of this Dissertation.

2*d*. Many practitioners have supposed that fever arises from some peculiar kind of *Matter that has got into the body;* and that *Fever* is an effort produced in the body to induce some operation, by which such *matter might be destroyed.*---Sydenham judiciously supposes that a fermentation takes place, which alters the qualities of the matter; or converts it into another species of matter, which has *not* the property of producing or keeping up this disease.---If it were indeed true that any particular species of matter *produced and kept* up a fever: it would follow, that until such matter was destroyed by a fermentation or some other process that might take place in the body, or else was evacuated; the fever would continue.—In that case, it would become a question whether some *other* means than such as exist in the body of itself, might be employed to take this matter out of the body, or to destroy it; (so that it might no longer keep up the disease.)

Some practitioners have supposed that this might be done by *Evacuations.*

If a blood-vessel is opened, the whole circulating fluids are *equally* evacuated; that is, every fluid; good or bad, noxious or innoxious, those that are commonly in the body and those that are there only by accident. No particular matter would be taken out more than another. And therefore it is not to be supposed that the matter occasioning a fever would be removed, by making this evacuation.—If the substances evacuated out of the body by the various passages be examined slightly, they appear to be more different than when examined more minutely; but still even upon minute examination, they differ very much.—It might happen therefore that some secretory organ is disposed to throw some *particular* noxious matter out of the system: and that increasing such secretion, (since [illegible] to a certain degree, occasions the secretion [illegible] the body) might cause the matter [illegible] to be evacuated: so that the fever [illegible] happen on the other hand, (as [illegible]) that a fever may arise *without noxious* [illegible] the body, or being generated in [illegible] there being no noxious *matter* to [illegible] purgatives nor any other evacuation [illegible] such matter and so remove the disease.—It [illegible] noxious matter *does sometimes* produce [illegible] and that after the fever is produced [illegible] in the body: as in the case of fever arising [illegible] application of noxious matter: But then it has been [illegible] the noxious matter produces the disease [illegible] is contained in the system after the fever [illegible] has no effect upon the disease: It neither increases [illegible] diminish it; and the fever often goes off, [illegible] the largest quantity of such noxious matter in the body.---In such cases it would not surely be conceived, if we could evacuate *such* matter, that the disease would be carried off: and in such cases therefore, purgatives would be of no use.

Hitherto the argument has been pursued *a priori.*---Yet neither the essence of fever, nor the operations of the human body, are sufficiently known (as the author has before observed,) to determine the efficacy of any medicine to carry off fever.

Experience must therefore be called in to determine whether purgatives, or any other medicine producing evacuation from a gland, may be employed to carry off the present disease.

If the matter be referred to the *experience* of the most judicious authors;---all those who have conceived fever to depend upon matter of a peculiar kind contained in the system, have agreed that it must be *concocted*, before it can be evacuated; (that is, that it must undergo some process before it is prepared for evacuation:) otherwise that evacuation neither by purging nor by increased secretion from any of the glands, can have effect in carrying off the disease. They are agreed at least, that evacuation *before concoction* must only be made at the *beginning* of the disease, to be efficacious: (for after the disease has continued a day or two, they have no longer any expectation that evacuating the matter will carry off the disease.)---The author, therefore, would be warranted by *authority* to say, that evacuation by purging or any other increased secretion from glands, would have no power to carry off fever; excepting the evacuant should be employed in the first twenty four hours; or else at the end of the disease, after the matter is concocted or has undergone such an alteration as to render it fit for evacuation.---It is farther to be observed, that when any matter is applied to the body, so as to produce fever, not immediately, but at the *interval* of several days, (such as the matter of the small-pox, or the measles, or putrid or infectious vapor); if *purgatives are employed during the interval* between the application of such matter and the taking place of the first paroxysm of fever, the fever has never been prevented from taking place; (at least in any case which the author has seen or which has been recorded.)---This is equally to be observed in *those* cases, in which the application of the cause has produced some immediate appearance of the first stage of fever, without producing a perfect paroxysm;

(these appearances continuing until a complete paroxysm has taken place).---In those cases where the application to the body of the matter which occasioned the fever, has produced no appearance of the disease; but the patient has felt himself in perfect health, until the complete attack of the fever came on: even in this case, neither purgatives nor any other medicine increasing secretion, have prevented the disease.---If the evacuation therefore by purging, or by increased secretion from any of the glands, does not carry off the matter from the body, *before* it has produced the disease; there seems to be little reason to hope that such evacuation will carry off the matter occasioning the fever, and the fever itself, *after* the fever has actually taken place.

The author has already observed, that *feculent matters remaining* in the intestines, (which they are apt to do when a fever takes place,) tend to increase the disease.---Though their *removal prevents the* mischief they tend to produce; yet (as far as the author has been enabled to judge from the attention he has paid to such cases), their evacuation has in no case done more, than merely obviate the mischief connected with their retention.---(Such evacuation has never, in any degree removed the fever; or prevented it from pursuing its ordinary course.)

Those practitioners who have believed that fever depends upon some noxious matter contained in the body; and that such noxious matter is concocted; (that is, goes through some operation by which it is prepared for evacuation;) have also supposed, that when a crisis took place, the matter was evacuated *after having been concocted*, and thus the fever was carried off. They have thought, that if it was not completely evacuated, it was necessary *to employ purgatives* to evacuate what might remain of the matter in the body, lest it should reproduce the disease.---They have also thought that [illegible] in the disease, but that it gradually subsided, [illegible] it has subsided more slowly on account of the noxious matter not being all at once evacuated.---And *therefore they* have given purgatives to make it be evacuated more speedily; so that the disease should sooner subside.---But the author is obliged [illegible] since he has seen *Relapses* much more [illegible] when purgatives have been employed after a marked crisis, or after the disease has gradually subsided; than when purgatives have not been employed.

Upon the whole then the author believes that though it is perfectly necessary at all times, during the progress of a regular continued fever, to keep the intestinal canal free of feculent matter; yet that making farther evacuation (by purging, or by increasing the secretion from any of the glands so as to occasion evacuation,) is of no use in carrying off the fever: but rather tends to prevent the fever from being carried off; or if it is carried off, to produce relapses. ---Moreover the author has already shown, that it required the whole force of the system to support the patient through the ordinary course of a regular continued fever: He has also shown that the force of the system is reduced by evacuation.---He must therefore conclude, that simple evacuation by purging, (excepting in as far as it is necessary to keep the *primæ viæ* clear of feculent matter,) is detrimental instead of being useful; and that simple evacuation also from any of the glands, (as tending to weaken,) is equally detrimental.

3*d*. It does not appear with any degree of certainty that *Antimony*, (a medicine which has been employed to carry off fever within this century or two,) was at all known to the Greek philosophers, physicians, or artists.—There was a substance which they named *Stibium*, which was employed to give a blackness to the eyes; but the effects which were produced from it (either among the Greeks and Romans, or among the modern inhabitants of Asia,) show that this substance was more probably a kind of lead ore, than an ore of antimony.

(A.) Antimony (or as it is more commonly called *crude antimony)* is the *Ore* of a metal which exists in many parts of the earth: being a compound of sulphur* and a metal; (in which the sulphur bears a much greater proportion to the metal, than can be combined with it chemically.) More properly, it is a compound of sulphur and the metal, diffused through a superfluous quantity of sulphur.—But though part of the sulphur retains some of its own properties: yet the sulphur so covers the metal or is so combined with it, as to prevent it from producing its *medicinal* effects.---This ore is solid in the heat of the atmosphere. It requires a little less than that degree of heat which renders substances luminous, to melt it; somewhere probably between five and six hundred degrees of Fahrenheit's thermometer: (but its melting point has not been exactly ascertained in as far as the author knows). It is of a dark blue color. It is generally found in a kind of crystallization; and sometimes in complete crystals, (which are prisms terminated by pyramids at one end, and at the other generally attached to each other*:) otherwise it is in a mass without form. More commonly these crystals are united together, so as to form a striated mass; (especially when they are unmixed with any other substance).---This metal has lately been found also combined with some substance, so as to form the same kind of crystals or striated mass; only of a dark red color; shining however with metallic lustre.---It has been conjectured (rather than confirmed by experiment,) that these crystals or this striated ore, contain arsenic (besides sulphur and the metal of antimony). This conjecture is probable; because this red ore of antimony has been almost always found with regulus of arsenic; (that is, the metal of arsenic pure:) and therefore experiments made to verify the existence of arsenic in this red ore, should be made in such parts of it, as are perfectly clear from the particles of the metal of the arsenic in which it is found.---The metal has also been found, but very rarely (certainly however sometimes) uncombined with any other substance; but so rarely as not to be employed medicinally.

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* Antimony readily combines with sulphur or phosphorus; but not with carbon, hydrogen, or azot.

Upon the whole, *all* the antimony which has been employed in Medicine, has been *procured from that ore of antimony, consisting of antimony and sulphur*.---This ore, when dug from the mine, is laid upon an inclined plane; formed from a mixture of clay and sand burnt in the fire. The inclined plane is heated red hot; when the ore of the antimony, being laid upon it, melts and runs off from the other substances with which it is mixed; and is received into a large and deep earthen vessel, in which (when it has stood to cool) it concretes into a solid mass.---If this solid mass concretes so, as when broken, to exhibit long striated shining spiculæ; it is a pure compound of antimony and sulphur: and fit to be employed medicinally.

(B.) A vast number of chemical processes have been employed to give to antimony *Medicinal* effects*; *(more than two or three thousand).* ---Of all of these, there are only *three* preparations at present much in use.

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* Haüy says that the primitive form of the crystal is octahedron, and of the integrent particles tetrahedron.

First. One is made by boiling the antimonial *ore* (or crude antimony) in a solution of pure (or prepared) *Kali* in water. The decoction (after it has been strained) is diluted with a considerable quantity of water; (at least ten times its weight.) The diluted solution is placed in a shallow vessel, and the surface exposed to the air; until a powder falls to the bottom of the vessel;---which (being taken out and dried) is called *Kermes Mineral.*†

Second. The second process is performed by mixing the *ore* of antimony (or crude antimony) finely powdered, with an equal weight of the *Shavings of the Horn* of any animal.—This mixture is to be put into an iron pot, which is to be heated red hot; and the mixture is to be stirred: the pot being kept red hot, until it ceases to smoke. The mixture is afterwards to be allowed to stand until it cools. It is then to be put into a crucible; which is to be covered with another crucible, (whose mouth is to be turned down into that crucible which contains the materials.) The crucibles, with the materials, are exposed to a white heat for two hours:---when part of the matter remains of a white color in the under crucible, which is to be used‡; (and part sublimes into the upper crucible, which is to be thrown away.)

Third. The third preparation is made by combining the *metal* of antimony with *Tartar* (an acid§ produced in the fermentation of various wines; which is found adhering to the sides of the vessels in which the wine has stood for a year or more, after the active fermentation has ceased.)---When two substances, which unite with one another *only in one proportion,* are combined together chemically, and the compound is purified; the substance is undoubtedly the same in all its properties.---It happens, nevertheless, with respect to the chemical combination of two substances which unite with each other in one proportion only; that when they are combined together *by different processes,* there are often different imperfections in the combination, or some want of purity in the compound. (This, though not made sensible by any chemical test, often occasions a very considerable difference in their actions as medicines.)---In the present instance of the *compound* formed of tartar and the *metal* of antimony, (or, perhaps, if strict adherence was to be had to chemical accuracy, we should say the *compound* formed of tartar and the *calx* of antimony;) this difference is conspicuous.

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* See Bergman's Dissertation on Antimoniated Tartar, (in his Physical and Chemical Essays, translated by Dr. Edmund Cullen;) for some of these processes. 1. 395.

† This was known also among the French by the name of *La poudre des Chartreux.*

‡ This the author calls afterwards "calx of antimony with *calx phospherata.*"

§ Tartar, as a salt, may be considered as a vegetable alkali supersaturated with a vegetable acid.

(C.) Of the several *Methods* of forming this *compound*, [of Tartar and Calx of Antimony,] the following is the best for medicinal purposes.

First: Take an equal weight of the ore of antimony separated from extraneous substances by fusion (as has been above described,) and of kali nitratum. Powder them together; and throw the mixture into a crucible, (heated so as to be just luminous,) by very small portions (about twenty grains at a time) until a deflagration takes place; wait till the deflagration is over; then throw in a little more of the mixture; wait again till the deflagration is over: and proceed in this manner, until the whole is deflagrated. Cover the crucible, and expose it to an heat just sufficient to melt the whole mass. Pour the melted mass into an iron vessel of a conical form, the point of the cone being downwards; and the whole will be found, (when it is cold and solid,) *divided into two substances:---one* of a reddish brown color and Heavier, which has fallen to the bottom; and the *other*, of a grey color, which is found at the top and is specifically Lighter.---The Heavier part is a compound of sulphur and the *metallic* part of the antimony.---A portion of the sulphur which was united with the antimony in its ore, (more than was necessary to combine with the metal of the antimony;) is converted into vitriolic acid, by uniting with the air of the nitrous acid. This vitriolic acid is found in the *upper* greyish mass; combined with the kali of the kali nitratum; and forms *kali vitriolatum.*—The *antimonium sulphuratum* (found at the *bottom)* is to be powdered, and to be mixed with one third more than its weight of *Purified Tartar;* and boiled in six times its weight of water for a quarter of an hour: the solution is to be filtrated, and the water evaporated: and the *compound* (of the tartar and the metal of the antimony) is to be crystallized.—This salt for *Chemical* purposes may be purified, by *dissolving it again* in water and *re-crystallizing* it; but it is a *Question* whether it would not lose some portion of its *Medical* powers by this purification.

lution of antimonium muriatum in water (or any other solution made

Again: The *metal* of the antimony may be separated from the sulphur with which it is combined in its ore, by mixing the ore with five times its weight of kali preparatum; (that is, with kali combined with gas; which gas has been called also fixed air or carbonic acid). The mixture, of the kali preparatum and ore of the antimony, is to be melted together, by a heat just sufficient to render them perfectly fluid.---The crucible being taken from the fire, is to be left till it is quite cold; and on breaking it, the *metal of the antimony* will be found at the bottom; and the compound of kali and sulphur at the top.---This is not the most economical mode of obtaining the metal of antimony;---but provided we take the ore separated from the other substances with which it is found mixed in the mine, (as has above been described,) the metal by this process is obtained in the *purest* state for medicinal purposes.---If the *metal* thus obtained is powdered finely, and boiled with pure *tartar* in water; a *compound* of the tartar and antimony will be obtained; which, *if purified by re-crystallization*, will be the same as that obtained by the process above described, in all its Chemical properties.

Another [or third] mode of obtaining this *compound* is---Take the ore of antimony purified (as has been already described;) powder it, and put the powder into a flat vessel; heat it till it begins to smoke; keep up the heat, (but take care not to render it so great as to melt the mass,) until it no longer smokes in any heat not sufficient to melt it. The remaining mass, which is the *metal of antimony calcined* (probably combined with pure air); if exposed to a greater degree of heat, will melt into a *glass*.---If this glass be powdered, and boiled with pure *tartar* in water, a *compound* of antimony and tartar will also be procured: which, *when purified by repeated solutions in water and repeated crystallizations*, will, in all its Chemical properties, be the same as when the salt is procured by the *two* processes already described;---but *if not crystallized* a second time, it will not agree exactly in its Medicinal effects.

Lastly and fourthly: The *metal* of antimony may be combined with *muriatic acid*, by several processes, for making the compound here in question. One of these, for instance, is: Mix the ore of antimony with that compound of muriatic acid and mercury, called corrosive sublimate. Perform a distillation or rather a sublimation; and expose the matter thus sublimed to the air of the atmosphere, until it has attracted water enough to render it fluid; pour this seby this or any other process in which the water is saturated with the antimonium muriatum,) into eight or ten times its weight of distilled water.---A *calx* of antimony will fall down in a white powder; called powder of *Algaroth*;---and this being boiled with pure *tartar* in water, will combine with it, and form antimonium tartarisatum;---which if purified by *re-crystallization*, will be the same to all chemical and medical purposes as the antimonium tartarisatum produced by the *three foregoing* processes; (but not, exactly in its medical effects, unless purified by re-crystallization.)

Although the antimonium tartarisatum when obtained by any of these *Four* processes, and purified by re-dissolution in water, and re-crystallization; may perhaps be the same for medicinal as well as chemical purposes, (which however has not been proved by experiment):---*Yet* when it has *only simply* been formed by these *four* different processes, *Without re-dissolution in water and re-crystallization:* there is a *difference in its operations* as a medicine.*

When the London College of Physicians reviewed their pharmacopeia for its reformation and republication in the year 1786, it became a question *which of the four processes they should adopt.*---Whenever a chemical or pharmaceutical question occurred, it was referred to a committee consisting of members of the College and of the Company of Apothecaries; and the processes were actually performed in the laboratory of the Company of Apothecaries; that so the best mode of performing the operation might be verified by experiment.---A question then having arisen with regard to tartarised antimony, it was prepared by all these processes.---The tartarised antimony thus produced was put into the hands of the Physicians of St. Bartholomew's and St. Thomas's Hospitals. In St. Thomas's Hospital they were given to more than a hundred patients; so that the same patient took of each kind in small doses.---The tartarised antimony prepared with the *crocus metallorum*† *and tartar*, was found to be capable of being exhibited in a larger dose than any of the others *without producing sickness:* and to act more powerfully as a sudorific: and therefore was preferred;—(whether properly or not, will be argued afterwards.)

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* The statements in p. 296—298 of this edition have not been compared again with the original.

† That is, by the first of the four processes above named; the *crocus metallorum* being formed "by detonating in a crucible equal weights of sulphuret of antimony, and nitre; and washing the residuum in water, till the liquid comes off tasteless."

(D.) When the science of medicine was *revived* with the other sciences' (first in Italy,) there does not seem to have been any medicine to put an end to fever immediately, recommended either by Galen or Celsus, or any of the Greek or Roman writers upon the subject; excepting *cold water* drank in large quantities at once.—It was not supposed that a fever might be cured by any other method immediately, so as to prevent a future appearance of the disease; (either by preventing the returns of the paroxysms, or carrying off the disease instantaneously, or by producing an immediate crisis).—The doctrine then was to attend to the disease while pursuing its ordinary course; only taking care of the accidents which might happen during that course; (that is, taking fever according to that idea of it, which the author has been endeavoring to lay down).

There arose in Europe *some time afterwards*, a number of *alchemists;* who made many processes with a view to convert metals into gold. - Having formed many substances by processes which did not make gold, but which produced many things which they were not able to turn to any profit; they tried to apply them to the cure of diseases. All such chemists must be considered as empirics; and the greater part of the substances which they produced were in fact useless.—Antimony, however, gained a reputation for carrying off some diseases without their going through their ordinary course: (and it is probable it was employed for this purpose in fever, as soon as the time of Van Helmont).—These chemists did not study medicine, nor did they distinguish diseases; but only aimed at making some profit of the result of their processes. They called every disease *Fever*, in which there was great sense of heat in the patient, and greater frequency of the pulse than in health: So that they not only employed preparations of antimony in fever; but in internal inflammations and various other diseases.—Practitioners, who were educated in the regular practice of medicines, studied principally the writings of the ancient Greek and Roman physicians; who for the most part used vegetable substances for remedies in diseases. The [first] modern practitioners, therefore, reprobated all substances which were the result of chemical operations; and considered them only as the boast of ignorant empirics. (This opinion went so far, that even so late as the time of Boerhaave; mercury was rejected by regular practitioners in the venereal disease.)—Some practitioners, (for there always will be men who balance between different doctrines,) employed indeed preparations of antimony, but such as had little or no effect; (such as antimony calcined by deflagrating it with three times its weight of nitre; and various other preparations equally inefficacious). They of course did not find any advantage arising from preparations of antimony; and therefore reprobated the use of all antimonial medicines in fever.

Hence it happened, that these preparations *were not much employed with efficacy in Great Britain*, before the time of the late *Dr. James*. Dr. James was a Physician of regular education, (having studied at the University of Cambridge); but was considered in some degree as an empiric, in consequence of employing a preparation of antimony, which he kept as a secret*.—The preparation he made use of consisted principally of antimony, calcined by mixing it with shavings of harts-*horn*, and exposing the whole to a great degree of heat. Upon analysing it, (which was done long before his death,) it was found to consist of a calx of antimony, mixed with bone ashes.—It is extremely probable, that he mixed along with it a proportion of *tartarised* antimony: (for the *author* knows that he purchased considerable quantities of tartarised antimony, two pounds at a time, from an eminent druggist). This might easily escape the scrutiny of a chemical analysis; since the quantity contained in one dose did not certainly exceed a quarter of a grain. From the very easy decomposition of tartarised antimony, when dissolved in a large proportion of water; so small a quantity might not be observed.

Dr. Cullen was the first eminent teacher of medicine who recommended the use of preparations of antimony to carry off fevers directly.—As most of the principal practitioners of the present day, in Great Britain, have been pupils of Dr. Cullen; its use has lately very much prevailed. If this had not been the case, it would have been a question whether it would not have sunk into oblivion; like any other empiric remedy whose preparation was kept secret.

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* Dr. James pretended that he had been cautious not to make public the secret of the powders bearing his name, till he had brought them to a "certain degree of perfection": but that a period had arrived when he was about to be less tenacious of it, and should discover it to those "physicians whose honor and integrity he thought a sufficient security against an abuse of his confidence."—But he either never made this communication, or his secret has been well kept; since it has never been authentically revealed to the public to this day. (See Dr. R. James's *Dissertation on Fever and Inflammatory Distempers*. 1758. 4th Edition, p. 66—69.)

The author's specification of his patent has been published in the United States: and may be seen in the last Volume of Medical Extracts by Dr. Thornton. Some traditionary accounts of the origin of his Recipe, will be seen in Mr. Townsend's Guide to Health, 3d London Edition, p. 10; which are copied into the Medical Extracts. For the modern analysis of the powder, see Dr. Thomson's Chemistry, in its later editions.

(E.) Dr. Cullen conceived, that the effect of preparations of antimony arose from their *producing sickness*.---Tartarised antimony is much more certain of producing sickness, than any other preparation that was known to him: and of course that preparation of antimony which produced sickness in the smallest dose, he considered as best.

The *author is of a different opinion;* to wit, that it is not the sickness produced by the preparations of antimony, that carries off fever immediately; but some *other* operation of the medicine.

First; because there are many other remedies which produce sickness to as great a degree as any preparation of antimony; yet these have no power whatever of making fever terminate sooner than it would, if it was left to pursue its own course. (The root of the *squill*, for instance, often produces sickness to a much more severe degree than any preparation of antimony; yet it has never been alledged, that it has the power of carrying off fever sooner than it would otherwise go off; supposing it allowed to pursue its ordinary progress. Moreover, the author himself has frequently exhibited the root of the squill as en emetic; and likewise in such doses as to produce nausea without vomiting; also in such doses as just not to produce nausea: without ever producing any thing similar to the appearances which take place in a crisis of fever; or without ever once occasioning a fever to terminate sooner than it would have done, if left to pursue its own course.)---So far therefore, the author must conclude, that the sickness occasioned by the exhibition of a preparation of antimony, is not the cause of its carrying off fever.

Secondly; the stomachs of different men (though otherwise in the same situation) are affected differently by the same quantity of any particular medicine: (the stomach of different persons, or of the same person at a different time, being able to bear a comparatively large dose without its producing sickness or vomiting). Indeed almost every medicine given in a certain dose will produce sickness and vomiting; so that even opium, if given in a certain dose, (that is, to the quantity of two or three grains,) will sometimes produce sickness and vomiting, and sometimes purging.—When a medicine is given in such a dose as to produce vomiting, it often loses its peculiar effect.—The bark of the cinchona, when given in such a dose as to produce vomiting, (either from the disposition of the stomach of the patient not to bear so large a quantity as the stomachs of men will generally bear, or from its being exhibited in a larger dose than common;) will often fail in stopping the progress of an intermittent fever.—It may be said, indeed, *first*, that, the *Peruvian* bark, (by producing sickness and vomiting,) will be thrown out of the stomach before it can be absorbed and carried into the blood-vessels. But the author has shown in his disser ation on a regular tertian, that it does not stop the progress of an intermittent fever by being carried into the intestines and absorl ; but by the impression it makes on the stomach and intestines. In the *second* place, it *may be said*, that the bark of the cinchona, by producing vomiting; is prevented from remaining a sufficient time in the stomach to make its impression there. But the author has also shown in the same dissertation, that the bark of the cinchona exhibited half an hour before the beginning of a paroxysm of a tertian intermittent, often makes sufficient impression to prevent the paroxysm from taking place. (It is often indeed more than half an hour after the exhibition of a dose of the bark of the cinchona before it occasions vomiting; but when it does occasion vomiting, it often does not prevent the return of the disease.)—In the third place, cerussa acetata given in a small dose produces neither vomiting, nor purging; (but on the contrary, a diminution of the peristaltic motion of the intestines; and not uncommonly a paralytic affection of them, and likewise of the extremities:) Yet when it has been by accident taken in a considerable dose (to the quantity of a dram or two as the author has seen happen in several cases,) it has produced both vomiting and purging; but no paralytic affection of the intestines or of any other part of the body, has ensued.—The author therefore conceives, that when any remedy produces vomiting; it very often by this effect loses its other operations on the system; and that preparations of antimony, in like manner, if they produce vomiting or even sickness (though no vomiting should ensue); lose their effect in carrying off fever.—The author farther conceives, that every medicine given in too great a dose, acts as a simple stimulant on the part to which it is applied; and loses its peculiar effects both on that part, and on the system generally. (Thus a moderate quantity of wine makes the stomach digest the food more readily than it otherwise would have done; but a large quantity of wine prevents digestion. A moderate quantity of spice gives a feel of warmth over the system; but a large quantity of the same spice produces pain in the stomach, coldness over the system, and frequently sickness and vomiting.) (It would be too great a digression to enter fully on the maximum of the doses of medicine: but if the author should live to finish these dissertations, it is a subject that he means to pursue.)

In the *next and last place*, the author has observed, when tartarised antimony has been exhibited in fevers; that when the patient's stomach could not bear a quarter of a grain of it (prepared as has been said) without producing sickness; it has happened rarely that it has produced any thing like a crisis, or in any way diminished or carried off the disease. On the contrary; when the stomach would bear more than that quantity (prepared in the same way, and by the same individual process), without producing any nausea, it has very often produced critical symptoms, or a complete crisis; so as to carry off the disease.

The author then differs in opinion from Dr. Cullen; and believes that it is not the sickness that has the power of producing a crisis (or any appearance of crisis) in a regular continued fever:—For it appears *first*, that several medicines, producing as great a degree of sickness as preparations of antimony; have no power whatever of carrying off fever, by producing crisis or appearances similar to crisis or in any other way.---*Secondly* it is proved, that producing sickness prevents medicines generally from operating in their own appropriate manner.---*Thirdly*, it is shown that preparations of antimony when they produce sickness in small doses, are not so efficacious in carrying off fever, as when it requires a larger dose of them to produce nausea; and also that they are more efficacious when no nausea is produced.

It appears then, upon the whole, that it is not the nausea produced by preparations of antimony, that renders them efficacious in producing symptoms similar to those that take place in the crisis of a fever, and so carry off the disease. (On the contrary; that any preparation which can be made to act with certainty in a larger dose, without producing nausea; is preferable for carrying off fever.)

Farther, it appears that tartarised antimony, as prepared *by boiling crocus metallorum with tartar in water*, and NOT purified by repeated solution and crystallization; is the best manner of preparing the *compound* of *Tartar and Antimony* for this purpose.

(F.) The next question then is, whether *tartarised antimony*, prepared as has been described;—or regulus of antimony, mechanically mixed with sulphur, (as in the *kermes mineral*) ;---or the calx of antimony, mixed with calx phosphorata (which formed at least a principal part of *Dr. James's powder*; and is the pulvis antimonialis of the last edition of the London Pharmacopeia):---are the preferable preparations of antimony for immediately producing symptoms similar to those taking place in the crisis of fevers.

The regulus of antimony in the kermes mineral, and the calx of antimony in the pulvis antimonialis, are neither of them *soluble in water*.---It has been held by many practitioners, that substances not soluble in water, must be combined with some menstruum in the stomach (with which they form compounds soluble in water) to be efficacious. If this be the case, these preparations of antimony, (to wit, kermes mineral and pulvis antimonialis,) will be subject to an uncertainty in their operation; by their meeting or not meeting with a menstruum with which they may combine, so as to form a compound soluble in water.

The *first* thing then to be inquired into is, *whether it be true, that if any solid substance, insoluble in water, be thrown into the stomach;* it will act upon the stomach and intestines, or upon the system generally; *without finding a menstruum* with which it will combine, so as to form a compound soluble in water.

It is well known, that sulphur thrown into the stomach in fine powder, (as it is when precipitated from an alkali by means of an acid,) or in fine crystals, (as when it has been recently sublimed); will act as a purgative.---In either of these cases, if the sulphur be perfectly pure and unmixed with any extraneous matter whatever; it is not soluble in water in the smallest degree.---It is true, that if sulphur be thrown into water, and left in the water with the surface of the water exposed to the atmosphere for some length of time; the sulphur will combine either with the air of the atmosphere or of the water; and form vitriolic acid, which is soluble in water.---But sulphur recently precipitated from an alkali by means of an acid, or recently sublimed; has not acquired any air; and yet it acts equally as a purgative. Moreover, vitriolic acid rarely acts as a purgative in any dose, if given uncombined with any other substance; whereas sulphur rarely fails of acting as a purgative.

It is therefore to be considered, *whether* sulphur meets with any substanne *in the stomach* with which it will combine; so as to form a compound soluble in water.---In the first place, it meets with *Water* in the stomach; with which (it has been already said,) it will not combine: nor will it be altered by it; excepting by long digestion, in the heat of the human body.---If it should alter by combining with the pure air of the water, the acid thus formed rarely acts as a purgative; nor does inflammable air, the other element of the water act as a purgative. It is therefore extremely improbable that it should act as a purgative, by decomposing the watery fluid that it meets with in the stomach.---Again: the water found in the stomach is impregnated with animal mucilages, (such as the solid matter of the mucus); but water, impregnated with animal mucilages, is not decomposed more readily by sulphur being applied to it; nor does it more readily combine with sulphur in consequence of its being already combined with such animal mucilage.---The gastric juice (as it is called, in counter-distinction to other fluids found in the stomach) has been thought by some to be a powerful menstruum; and to unite with the food, so as to form chyle or some compound preparatory to the formation of chyle. Concerning this solvent power of the gastric juice the author has argued in his Treatise on Digestion; the result of which argument appears to be, that it has no such solvent power; (on the contrary it appears that its sole power is to *coagulate* certain animal and vegetable substances, *so that they may be retained in the stomach until they go through that part of the process of digestion which is necessary in the stomach.)* No experiments also have been made to shew whether or not this gastric juice will combine with sulphur so as to form with it a compound soluble in water. It is extremely improbable that it does; since water, combined with other mucilaginous matters, does not dissolve sulphur more readily than pure water. Gastric juice likewise renders certain substances insoluble in water, that are otherwise capable of being combined with water. It is therefore improbable, that gastric juice should so combine with sulphur as to form a compound with it soluble in water.---Farther: in the juices of the stomach, there is sea salt, (that is, natron muriatum,) ammonia muriata, and ammonia phosphorata, and sometimes perhaps calx muriata, (as there are in all other juices of the body): but none of these salts combine with sulphur so as to form a compound soluble in water.---Other substances indeed are *occasionally* found in the stomach, but not always; but sulphur *almost always* proves purgative; and therefore sulphur does not act on the stomach and intestines, in consequence of meeting with a substance in the stomach which is accidentally found there.---Sulphur consequently does not act as a purgative in consequence of any thing it meets in the stomach, with which it forms a compound soluble in water.

Sulphur, when it gets into the duodenum, meets with *bile;* which might combine with it, and form a compound soluble in water. The like might happen with *pancreatic juice;* with which it often meets in the duodenum. But from the author's experiments, (which it would be too great a digression to relate here) sulphur is neither capable of combining with bile nor pancreatic juice: And therefore sulphur does not act by combining with bile or pancreatic juice, so as to form a compound soluble in water.---As like observations may be made with regard to the *other* fluids it meets in the intestinal canal; it is at least extremely probable, that it does not combine with any of them, so as to form a fluid capable of being combined with water.

Sulphur indeed is capable of being combined with that *vapor* which Van Helmont first noticed and called *gas;* (but which has since been called fixed air, and by many other names): This vapor is found sometimes in the intestinal canal.---Sulphur is also capable of being combined with *inflammable air.*---But neither of these vapors is found generally in the intestines; whereas sulphur almost always acts as a purgative.

We must therefore conclude that sulphur acts upon the stomach and intestines in a *Solid Form.*---And as it is capable of acting on them independently of any mechanical effect; a solid is capable of acting on the stomach and intestines medicinally.

Regulus of antimony, and the calx of antimony made by mixing antimony with shavings of hart's-horn, (burning them together, and exposing them to a great degree of heat;) *may* therefore so act upon the stomach without being combined with any substance, as that the compound shall become soluble in water; and therefore they *may* act independently of any menstruum they may meet with in the stomach.---It has been often affirmed in medicine, that whatever was shown to be *possible,* was also true. This however is a proposition totally repugnant to all the laws of evidence. It does not follow, therefore, that although *one* solid in powder *may* act upon the stomach and intestines, every solid does.

The *Next Question* then that comes to be discussed is, whether the fine powder of the regulus of antimony in kermes mineral, and the calx in the pulvis antimonialis, *do* act in a solid form;---without being combined with some substance with which they form a compound soluble in water?

In the healthy state of the body, the fine powder of the regulus of antimony in kermes mineral, and the calx of antimony in the pulvis antimonialis, being thrown into the stomach; will frequently act as an emetic.---In the healthy state of the body, there is no acid in the stomach not combined with an alkali: therefore neither of those preparations of antimony can act in consequence of being dissolved by an acid in the stomach;---unless they should decompose the neutral salts. Whether they can decompose the neutral salts, (to wit, sea salt, common sal ammoniac, or phosphoric ammoniac,) as they are found in the stomach; or whether they are soluble in the neutral salts themselves, is not known; and therefore the argument must be taken on another ground.

If tartarised antimony (prepared as has been described) be exhibited to a man in health; it hardly ever happens that a third part of a grain can be taken without producing sickness and vomiting, or purging. It very rarely produces any nausea, if taken in the quantity of a fifth part of a grain, by an adult. On the other hand; the quantity of three grains of pulvis antimonialis, or of kermes mineral, will sometimes be required to produce sickness and vomiting; and very often in other cases, even the quantity of eight or ten grains may be taken without any sensible effect. (The author indeed has seen them often employed to the quantity of twelve or fifteen grains, without having any apparent effect at all.)---Moreover, kermes mineral, and the pulvis antimonialis, the author has seen (in several instances) exhibited at the interval of six hours, for four and twenty hours or forty eight hours, without producing any sensible effect; and at last, (all at once) they have brought on a severe vomiting and purging; so as to weaken the patient very much.---It must, tainly, or equally certainly, compared with the preparations of antimony which have been enumerated?—It is matter of consideration whether this question should be first discussed;—or whether it would be better to enter into the argument in what manner the preparations of antimony (hitherto described) should be employed, so as to have the best chance of carrying off the disease?

Reasons might be urged for taking the one or the other argument into discussion first; but it is not worth debating this.—It is therefore the author's determination, upon the whole view of the subject, to attend first to the *First Method of employing preparations of antimony to produce crisis in fevers*.—[illegible] he is not sure that he is right; as he may be obliged in [illegible] stances, to take notice of the effects of other medici[illegible] a similar action in fevers, and produce a crisis in them.)

The author has already said, that when a patient is attacked with fever, it often happens that there is *undigested food in the stomach*; which will therefore require to [illegible]*ted*. From the fever itself, likewise, other noxious matter is probably produced in the stomach; in some degree similar to that which we find covering the tongue.—It is necessary to evacuate such undigested food; because by remaining, it may contaminate the food that may be afterwards thrown into the stomach (by exciting in it the acetous, putrefactive, or other noxious fermentations); and prevent it from being converted into a substance which is afterwards to be formed into chyle.

Vomiting in itself has a tendency (after the sickness which produced it is over) to occasion a glow or warmth over the whole body; followed by moisture on the skin, softness of it, an universal softness and relaxation of the whole muscles, a flow of fluids through the whole secretory vessels, a general tranquillity over the whole system, and a disposition to sleep.—Although vomiting, induced by any means, has this effect in some degree when the sickness occasioning it is gone off; yet it has not the same effect, in an equally powerful manner, when produced by any means whatever.—If vomiting be produced by *tickling* the throat, or by introducing any solid substance into it (as a feather or the finger) or if by a cough the larynx be forced up into the throat; some sensible effect similar to what has been just described, takes place.—But if preparations of *antimony or ipecacuanha* be exhibited, so as to produce vomiting; the appearances of crisis which have been above described, arise in a much greater degree, when the sickness is gone off.---Although therefore *all* emetics, (when the sickness is gone off which occasions the vomiting,) have a tendency to produce appearances similar to the appearances which take place in the crisis of fever; and therefore actually tend to produce crisis in fever: *yet they do not all tend to produce crisis of fever equally.* It is therefore best to choose such substances for emetics, as have the greatest tendency to produce critical symptoms *after* the vomiting is gone off; that the emetic may have a better chance to produce a crisis in the disease.---It is *consequently better* to employ preparations of *antimony or ipecacuanha,* as emetics, in the beginning of a fever;---than warm water, infusion of chamomile, white vitriol, squills, &c.; which have no tendency to produce symptoms similar to those which take place in a crisis of fever, independent of the action of vomiting.

It is not always that any of the known preparations of antimony produce vomiting, when exhibited either in health or in fever. Sometimes tartarised antimony in the dose even of several grains, does not produce vomiting, but purging; (given either in health or to a patient affected with fever.) It is wished, however that we should be certain of producing vomiting, to occasion the evacuation of any noxious matter (such as has been described) from the stomach.

Ipecacuanha (the root of a plant of which the jealous government of Spain has prevented the perfect investigation,) is very *certain* in its operation as an emetic; much more so than any other substance at present known. It has besides the same kind of power which antimony has (though perhaps in a less degree) of producing those appearances taking place in the ordinary crisis of a fever.---It is therefore better to mix ipecacuanha with tartarised antimony; and to exhibit them so mixed, as an emetic, at the beginning of fevers.

5th. The next point to be argued is, the *Dose of the medicine we are to employ as an Emetic, at the beginning of fevers.*

When a medicine is to be exhibited as an emetic, it does not appear under *one view* to be of much consequence how *large* the dose is: (for let the dose be ever so great, the first evacuation would seem to bring up the superfluous part of the dose: and this consideration explains why the very various doses of emetics which have been exhibited in various cases, produce very often nearly the same effect.)

---But though this be the case in many instances, it is not in all: (for it happens in many instances, that a large dose of an emetic produces most violent vomiting, which is repeated many times with great distress to the patient.)---Hence it would seem that an emetic may lie so long upon the stomach, before it is brought up; as to make an impression which lasts after the emetic itself is entirely evacuated.---In fevers, the violence of the exertions, when an emetic thus continues to operate, (perhaps six or eight times,) in the first place exhausts the force of the system; (which is not to be thrown away in this disease:) and therefore on this account too large a dose of the emetic should be avoided.---Moreover, it has already been observed, that when any medicine is *made to act in too great a degree, it loses its proper effect;* and becomes a simple stimulant. Hence the action of vomiting itself, by being too frequently repeated (from exhibiting too large a dose of the medicine,) does not produce appearances similar to those which arise in the crisis of fever; so as to carry off the disease. For this reason ipecacuanha and antimony do not produce these appearances, if given in too great a dose. Thus by giving too large a dose of these medicines as emetics, the effect of carrying off the fever (either by the action of vomiting itself, or by the effects of the antimony and ipecacuanha,) is frustrated.

The *proper* dose may be about eight grains of ipecacuanha, and one grain of tartarised antimony.

If an emetic of almost any kind (which takes up but little bulk) be exhibited, and there should be nothing in the stomach to be evacuated; there arises an effort to evacuate, (or in other words a *Reaching;)* which is attended with a great deal more uneasiness and pain, than if there was a quantity of some substance in the stomach to be evacuated.---This has induced practitioners to give, after an emetic has been exhibited, *watery fluids to drink;* that there might be something to be evacuated, in order to take off the uneasiness and pain of the reaching.---At the beginning of a fever, *Emetics* (as we have just observed) are employed for *two* purposes: *First,* to evacuate from the stomach any undigested food which was either contained in it when the fever took place or was thrown into it afterwards; or some noxious matter formed in the stomach in consequence of the fever: and in the *second* place, (by the joint action of the vomiting, and of the medicines employed as emetics,) to induce a crisis to the fever; so as to put an end to the disease.---For evacuating noxious matter from the stomach, (if it be undigested food;) two or three evacuations by vomiting are certainly sufficient; (and especially, if after the first evacuation, a quantity of warm watery fluid be thrown into the stomach.) If noxious matter also be formed in the stomach itself in consequence of the fever, and be affixed to the stomach, (as the crust is to the tongue;) no force will ever separate it: and if it should not be so affixed, two or three evacuations will be sufficient to carry it off.---*If two or three fits of vomiting* therefore should take place, it is sufficient for all these purposes.---On the *other hand,* these moderate efforts will not prevent either the act of vomiting itself or the effect of the medicines (which have been enumerated as proper to produce it,) from bringing on appearances similar to those arising in the ordinary crisis of fever.

It does not seem indifferent *at what Time of the Day* an emetic is employed; if we wish it to produce any other effect than simply to evacuate noxious matter.—In the *first* place, the operation of vomiting, after it is over, tends to produce sleep. Mankind being generally disposed to sleep about nine, ten, or eleven in the evening; if the disposition to sleep, brought on by the emetic, coincides with the ordinary time of the twenty four hours in which there is a disposition to sleep; the two together will be more powerful in producing their effect, than either alone. The rest thus procured by this double disposition, will be more refreshing, than it would have been from either of them simply; and will tend to restore or support the strength of the patient. Moreover, it has been observed, that sleep produces a disposition for all derangements of the system to go off, and consequently fever: it therefore increases the chance of the action of the vomiting, and of the remedies employed to produce it, in occasioning the appearances which arise in the ordinary crisis of fever; and consequently in carrying it off.—*Secondly,* it has been observed, that the exacerbation of a regular continued fever takes place generally between five and six o'clock in the evening; and that the effort towards a crisis made in the hot fit is strongest about three or four o'clock in the morning.—If the emetic be then exhibited *between seven and eight o'clock in the evening;* the disposition to crisis produced by the vomiting, by the action of the substances employed as emetics, by the sleep, and by the ordinary effort of the fever itself; will all operate together so as to have a better chance of producing a crisis in the disease.

It would therefore seem, when we employ an emetic in a fever to evacuate any noxious matter from the stomach (which has got into or is formed in it by the means described); that it is better to exhibit in a moderate dose, such emetics as have a tendency to produce symptoms similar to those which take place in the ordinary crisis of fever.—It seems also necessary in order to prevent the violence of the reaching, to introduce some *watery fluid* into the stomach; (but it is better not to employ this fluid in too great a quantity; nor to repeat it too frequently).—It is likewise better to exhibit the emetic about *seven or eight o'clock in the evening*. (Thus the action of the vomiting itself, of the medicines employed to produce it, the sleep, and the ordinary effect of the evening paroxysm of fever itself; will all operate together in tending to bring on a crisis and terminate the disease).—If any one should think the author too minute in these attentions; he must consider that if, by omitting any of them, a crisis should not be produced, where it otherwise might have been; the patient may be subjected for a fortnight (or longer in some instances,) to a distressing and dangerous disease.

It happens sometimes, when an emetic is employed, that with every precaution *the sickness will continue*; and the patient shall pass a restless and distressing night, more so than would probably happen if no emetic had been exhibited: but this must be left to be considered among the *irregularities* which happen in the disease.—On the *other hand*, it happens not uncommonly when a patient has taken an emetic, (especially if regulated as is described above,) that he falls in less than an hour after its operation, into a quiet sleep; when a gentle easy perspiration takes place at first, and increases into a sweat more or less profuse; all the secretory vessels are relaxed, and the skin and the muscles also: a perfect crisis is produced; and the patient is freed from the disease.—It happens *likewise not* uncommonly, that though perfect crisis does not take place, the fever is considerably alleviated, and goes through its remaining course with less danger to the patient.—The author therefore thinks, that if a practitioner be consulted in the beginning (that is, in the first four or five days), an *Emetic should always be exhibited in a regular continued fever.*

6th. Independent of vomiting; the *preparations of antimony* (such as have been described) have *other* means of producing appearances similar to those that arise in the ordinary crisis of a regular continued fever.---These preparations of antimony *have been employed in several ways to produce this crisis.*

First, if some one of the preparations above described be exhibited in a dose just not sufficient to produce sickness (when they have been exhibited empirically, this has not been much attended to), in the evening about six o'clock; and if the same dose be repeated about half an hour past eight, and again at eleven:---then if the patient be laid in flannel or cotton or some other bad conductor of heat, his head being bound round with a cloth of the same kind, and small quantities of a warm watery fluid (such as barley water) given *frequently,* so as to throw him into a profuse sweat if possible; and if this sweat be kept up, by repeating the preparations of the antimony every four, five or six hours, (as the patient can bear it, without occasioning any sickness);---if this practice be continued for four and twenty hours: it has happened in many cases, that when the preparations of antimony above described have been thus exhibited, a crisis has been produced; and the fever been entirely carried off. This particularly occurs, if the remedy be exhibited in the first three or four days of the disease.---The crisis is thus very evidently the effect of the medicine; and there is a degree of brilliancy in this practice which has made it be adopted by many practitioners who have a degree of empiricism.---It is to be observed, that *such practitioners and all empirics* have often exhibited antimony in this manner (or sometimes in one dose without repetition) at *any* time in fever; sometimes with success; (but this will be considered afterwards).

The mode however in which antimony appears to the *author* to have the *Best Effect, with the least detrimental consequences,* is, in the first place to employ it as *soon as possible in the disease;* for it is more efficacious in the first attack of the fever, than in the second day of the disease, (counting the days as has been before pointed out); and it is more efficacious in the second day of the disease than in the third; and in the third than in the fourth, &c.---It should be employed in the *first place as an emetic, mixed with ipecacuanha;* as has been already described: (and if the weather should be cold, it is better to lay the patient in cotton, and treat him as has been described in the management of a regular continued fever left to pursue its natural course.---After having exhibited the emetic, (as has already been described); if the patient being in bed, should *continue sick and restless*, (as has been above described, which is sometimes the case,) about a grain of opium (or an equivalent dose of its tincture) may be given without detriment; along with a little tincture of cinnamon or any other aromatic. (This medicine should only be exhibited under the circumstances of the patient's continuing sick and restless: in which case it takes off the sickness; and suffers the antimony to act.)---*Six hours after the action of the emetic is over*, if the patient should be awake, a dose of one of the preparations of antimony above described, should be exhibited; and in such quantity as the stomach can bear without sickness. If he should be asleep at this interval (from the last action of the emetic,) as soon as he awakes it should be given.

The author *prefers tartarised antimony*; (prepared as is described above, in the last edition of the Pharmacopeia of the London College.) And the *dose* of tartarised antimony the author would exhibit, in the first instance, is two sevenths of a grain.---Or if the tartarised antimony be *dissolved in wine*, (as is above described, in the vinum antimonii tartarisati of the Dispensatory,) thirty drops of this solution should be dropped out of such a phial as is commonly made to contain two ounces in England.---The author is sensible of the uncertainty of measuring any thing by drops; the quantity contained in a drop depending upon the viscidity of the fluid dropt. (Four drops and an half of alcohol, for example, dropt from the same vessel, weigh only one drop of water; the alcohol being much less viscid or adhesive than the water.) Again; the size of a drop depends upon the thickness of the lip of the phial from which it is dropt; or rather on that part of the lip from whence it is dropt.---These difficulties may be easily obviated; by trying how many drops of any fluid dropt from one part of the lip of any one phial, measures or weighs. If the phial be not above four fifths full, the same number of drops, if they exceed twenty, will be found always nearly of the same measure and weight.---The author prefers this mode of determining the dose as the most readily measured.---It has this advantage, that if thirty drops of the vinum antimonii tartarisati should produce, on its first exhibition, any nausea; it may be diminished by four or five drops on the second exhibition. If upon this second exhibition it should produce no nausea; or if upon its first exhibition, in the quantity of thirty drops no nausea should ensue; two drops may be added to each dose; until the greatest quantity is found out that the stomach can bear without nausea. (The author has already observed, that nausea prevents the medicine from having a disposition to produce symptoms similar to those that arise during the crisis of fever; and so to carry off the disease.)

If the author should be mistaken in thinking that tartarised antimony (prepared as has been described) is the best preparation of antimony for producing crisis in fever already known; or if some better preparation should be found out; yet (as the stomachs of different men, or the stomach of the same man at different times, are differently impressed by the same doses of almost all medicines;) he conceives that some mode should be taken similar to that which has been described above, to ascertain what quantity of the intended preparation of antimony the stomach can bear without nausea; and that it should be exhibited in that dose.

Along with the first dose of antimony (to be exhibited in six hours after the last operation of the emetic,) it may be proper to give a moderate quantity of some *aromatic;* to render it more agreeable to the stomach of the patient; (such as the infusion or distilled water of mint or cinnamon; or any other medicine of the same kind.)

If the emetic exhibited should have produced a gentle sleep, and the symptoms of a crisis appear; if the pulse has returned to the ordinary number of pulsations in a given time, and the patient should appear to be entirely freed from the fever:---yet it will not be superfluous to *repeat* the preparation of antimony in the manner described; (as no mischief whatever can arise, and it may secure the patient from the return of the disease.)---After a dose of antimony is thus exhibited, it is to be *repeated at four or five or six hours interval.* (The interval is to be determined from the effects which this dose has produced.)---If the patient has had a crisis produced, and a general freedom from the disease has taken place (only with some languor;) it will be sufficient to repeat it every six hours; and continue it for twenty four hours.---If hardly any relaxation should have taken place from the emetic, but all the symptoms of fever (such as great depression of strength, weight about the precordia, pain in the forehead, dryness of the skin, &c.) should remain in a great degree: t will then be proper to repeat it every four hours; and continu ch repetition for four or five days.

If a prep on of antimony is given in this way at the beginning of fever, a ntinued for four or five days, without producing a crisis by the fever is cured or converted into an intermittent; it rarely produces a crisis afterwards: nevertheless it often makes the relaxations greater, prevents or diminishes delirium, and makes the whole fever go on with less violent symptoms.---It is better therefore to continue to exhibit such a dose of the preparation of antimony, as the stomach will bear without nausea, every six hours. ---If symptoms of weakness begin to appear; or if the antimony should produce sweating, purging, or any other topical evacuation, without relieving the fever; it is immediately to be omitted.

It happens however in many instances, that in the course of this time, the patient has a moisture produced in the *skin*, while a lateritious sediment takes place in the *urine*, the skin by degrees becomes *soft*, the *tongue* begins to grow moist on the edges and is cleared of the crust that forms upon it, and all the *other* critical symptoms take place gradually; the patient becoming freed from the disease.

If either the symptoms of the attack of the disease should be so violent, as to give little hopes that the patient will recover, should the disease pursue its ordinary course; or if such an epidemic should prevail, as destroys the greatest number of patients afflicted with the disease: under such circumstances perhaps, it might not be improper to *force* a profuse sweat, (in the manner that has been described.) ---Unless however there should be little hope of the patient's recovery should the disease go on as usual, such means of occasioning sweating ought not to be employed.---*First*, because sweating, though it be one of the appearances that take place in the ordinary crisis of fever, yet it is very far from being the only one; (for not only the secreting vessels of the skin are relaxed and secrete a larger quantity than usual; but all the other secretory vessels are equally relaxed, and also the muscles, and whatever other part is relaxed, in the ordinary crisis of fever.) We see also that profuse sweating takes place sometimes in a regular continued fever, without any relief to the disease.---In the *second* place, every unnecessary evacuation tends to weaken the patient; and to give him a less chance of being supported through the course of the disease, if a crisis should not be produced.

Hitherto the author has been supposing the patient to apply to a practitioner in the *first day or two of the fever*.---In that case, (provided the disease be a regular continued fever,) by employing preparations of antimony in the manner described, symptoms similar to those which take place in the ordinary crisis of fever will be produced (as far as the author can judge from his experience) in one *half*, perhaps he thinks he can say certainly in one *third*, of the cases of regular continued fever.

If no medicine has been given during the first days of the disease, or if no emetic has been exhibited; it will be proper to employ an emetic (in the manner which has been mentioned) *at any time in the first week of the disease, or even on the eighth or ninth day;* (especially if there should be a greater foulness of the tongue, or more nausea, than in proportion to the other symptoms of the disease).

If an emetic should have been employed at the beginning of the disease, and the patient at any time afterwards during the course of it should have a greater foulness of the tongue, weight upon the stomach, and nausea, than in proportion to the other appearances of the disease; it is proper to *repeat the emetic*.---In this case, only about five grains of ipecacuanha should be given, which rarely fails of proving emetic. It should be exhibited in the evening: (but the other regulations laid down for the exhibition of an emetic at the beginning of the disease, are not necessary to be attended to.)

If no preparation of antimony has been exhibited on the first two or three days of the fever; the exhibition of it afterwards, will have less chance of carrying off the disease: (for after the fever has continued longer than *three days*, the system has acquired a habit which renders the disease more fixed.)---Although the sooner the preparation of antimony is employed, the production of a crisis, or the gradual going off of the disease by critical symptoms taking place after each other, is made more probable; the fever in many instances will be carried off even by exhibiting it *before the end of the second week of the disease*. (The sooner however it is exhibited, it will have the greater chance of removing the fever.)

Although preparations of antimony should not produce a crisis so as entirely to carry off the fever; they produce a crisis in many cases, which though not quite perfect, yet *converts the disease into an intermittent fever;* (which is a disease much more easily managed than a continued fever).

Supposing preparations of antimony not to produce such a crisis as to convert a continued fever into an intermittent, or to carry off the disease; yet it often happens that they give *great relief to the patient;* (so that the head-ach is diminished or entirely carried off, a less degree of delirium takes place than otherwise probably would have occurred, the *primæ viæ* are not so much disordered, and the fever pursues its course with less distress and danger.)

It happens sometimes, in the *first two or three days of the fever,* that there is great hardness, fulness, and strength of the pulse; as well as obstruction; that with these, there is flushing of the face and redness of the eyes; and that other symptoms of general inflammation take place in such a degree, as to render it necessary to take away a quantity of blood.—In this case it becomes a question whether preparations of antimony should be employed immediately at the beginning of such fever; *before blood is taken away?*—This is a case however which happens much seldomer than would be suspected from what authors have written on this disease;—and the argument will be entered into in that dissertation, in which the *irregularities* that take place in continued fevers will be noticed.

If upon exhibiting preparations of antimony, some one evacuation should take place, without a relaxation of the *other* secretory vessels; the antimony should not be persisted in. (Thus if profuse sweating should be produced; and at the same time the tongue should remain dry and covered with a fur, and the patient continue costive, and the other parts be contracted: if also a lateritious sediment should appear in the urine or a flaky white sediment, the skin remaining dry and contracted, and the tongue dry and covered with a fur; or if the patient should be purged, the skin remaining dry at the same time:) In any of these cases, there is little hope of antimony being of any kind of use, if the system should continue in this state for forty-eight hours.---The medicine will then rather tend to weaken and destroy the patient; and therefore ought not to be continued.

7th. It is next to be considered whether there is any *other* medicine, which has the same effect with preparations of antimony;---(that is, will induce the appearances which take place in the ordinary crisis of fever, so as to carry off the disease).

In the history of medicine that we are able to collect from the

Greek and Roman authors, whose writings have come down to us; there is *one instance only of a medicine having had this effect*, to wit; when the physician of Alexander the Great exhibited to him a medicine, which is said to have occasioned the appearances which ordinarily take place in the crisis of fever; so as to carry off the disease in less than twenty four hours. We have no trace of what this medicine might be; (and it is singular that the same medicine should not have been exhibited to him again in that remittent which he caught, by surveying the marshes of the Euphrates, near Babylon; in order to have them drained).

Cold water was exhibited by Greek physicians, in fever; often with a view of immediately putting an end to the fever. From the best information the author has been able to make out from perusing their writings, they exhibited it reduced *nearly to the freezing temperature*; in the *quantity* of from one to two quarts at once:—so as to produce great evacuation by vomiting, purging, and sweating.

It was by no means the practice of the ancient Greek physicians, (who were the principal and almost only practitioners in the Roman dominions,) to give watery fluids, or indeed any thing to drink; at the beginning, or during the paroxysms of fever. (In Petronius's satire, one of Trimalchio's guests says, that a man, at whose funeral he had been, was a very obedient patient to his physicians; for he did not suffer a drop of fluid to pass his lips for seven days: and he died notwithstanding.)—It also was not the practice of the Greek or Roman physicians to give even cold water constantly for drink in small quantities;—but in a *large quantity at once*, perhaps with a view of drowning out the heat, which they considered as the essence of the disease): It was to be drank, as Celsus says, *ultra satietatem*. It is described however as bringing on those appearances, which take place in the ordinary crisis of fever; and in certain cases, as carrying off the disease.—This not having been practiced during the last period of forty years, the author has had no experience of giving large quantities of cold water at once for drink; and cannot therefore say what its effect may be.

During this period of time however it has been common, (in consequence of Dr. Boerhaave's idea of rendering the fluids thinner in fever) to exhibit *small quantities of warm watery fluids* very fre-

[illegible] same purpose.—That warm watery fluids, forced up- [illegible] ften in fevers, are of no manner of use; the author [illegible] ieve from repeated experience: and it would be easy [illegible] ry reason on which this practice was introduced, was p [illegible] ithout foundation.

It was [illegible] practice among some of the ancient physicians to employ th [illegible] *bath*, in certain cases of fever, to produce a crisis; and sometin [illegible] he *warm bath*: but the history of both these practices is so little d [illegible] led in their writings, that the author has not been able to make [illegible] t their effects; or whether they actually occasioned symptoms sim [illegible] those that take place in the crisis of fever; or whether they a [illegible] ied of [illegible] ease or no.

The auth [illegible] matio [illegible] that both in Italy and Spain, drinking lar [illegible] ater at once, as well as using the cold or war [illegible] in diseases called by them febrile: but h [illegible] never from [illegible] ooks, or from the conversation of the p [illegible] icians of those cou [illegible] s whom he has seen here; make out the idea they affix to febrile [illegible] diseases, nor the actions of these remedies.

The author must therefore dismiss this subject, (viz. the application of cold water:) as nothing is known of it at present from any thing which can be considered as evidence.---It requires *half a century at least* to destroy the bloom of novelty which deludes, when a new medicine is recommended; or indeed to fix any evidence in medicine. (It was much longer before the bark of the cinchona was brought into general practice in intermittent fever: and it was longer still before mercury was allowed by regular practitioners to be employed in medicine.)

8*th*. The next substance which has a tendency to produce those appearances which take place in the ordinary crisis of fever, is the *root of ipecacuanha;* (an American plant; and which could not therefore be known to the ancient Greek and Roman physicians.)

The root of this plant was first brought into prac[illegible] as an emetic.---There is a tendency in mankind to employ almost every thing in medicine; (a tendency perhaps given them by the Almighty to supply the want of the knowledge of the ground on which medicines act; medicine being a science of so very great difficulty.)---Of the substances already known in those countries with which Europeans were acquainted, *before the discovery of America;* almost every thing had been tried, and even celebrated, in medicine: as dead men's bones, cobwebs, and the rags that enveloped the bodies of the ancient Egyptians; as well as opium, colocynthida, and squills. Whenever therefore *new countries* were discovered, and in consequence new plants; we constantly find practitioners in medicine using them in disease.---Hence then the root of the ipecacuanha, being found out to have an emetic quality, was employed first as an emetic.---Afterwards when it came into Europe, its other effects began to be investigated; as its action in rheumatism, diarrhœa, and dysentery:* in all which cases it seems to be analogous in its operation with preparations of antimony.

The present inquiry is to determine, how far ipecacuanha is *analogous* to preparations of antimony in fever.

It has been already said, that if it is wished to produce vomiting at the beginning of fever, it is better to mix ipecacuanha with preparations of antimony; it being thus surer of acting as an emetic.---If at any time, during the progress of the disease, there should be a considerable degree of sickness, (especially if attended with a thick brown fur upon the tongue;) though an emetic has already been exhibited, it is useful to employ from five to ten grains of ipecacuanha, to act as an emetic (as has been already observed.) It not only throws off any noxious matter in the stomach; but also produces moisture upon the skin; the sickness is relieved; and sometimes a complete crisis takes place, and the fever is carried off.---If a symptomatic *purging* should take place, without any relief as to the disease; if such purging should take place along with the fever, or soon after its beginning; then (as far as the author's experience goes,) ipecacuanha is better used alone as an emetic. It is also better to give such small doses of it, as just not to produce sickness, every four or six hours. Such doses have a chance of carrying off the purging;---and likewise of producing symptoms similar to those arising in the ordinary crisis of fever, (and so entirely to carry off the disease:) herein exceeding the preparations of antimony.

In all cases of fever, ipecacuanha seems to act much like preparations of antimony, in producing symptoms similar to those produced by preparations of antimony;---and in many instances they carry off the disease, though not with the same certainty.---If we give ipecacuanha, (instead of preparations of antimony;) the stomachs of most patients will bear a grain, without occasioning sickness; and few stomachs will bear two grains without sickness.---In other respects, the same attentions are to be paid when we employ ipecacuanha; as when we employ preparations of antimony.

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* The elder Helvetius was the first in Europe who gave reputation to ipecacuanha in dysentery; and he received 1000 louis d'or from Louis XIV. for making known the secret of his practice on this subject.

9*th.* Several of the *Neutral Salts*, (such as kali vitriolatum, ammonia muriata, ammonia acetata, and some others,) have been employed in fevers; with a view of producing the symptoms which take place in the ordinary crisis of fever; in order to carry of the disease.---The author has seen moisture of the skin arise after exhibiting them; but he cannot say that in any instance he could determine that they brought on a complete crisis, in a regular continued fever. During the exhibition of these neutral salts, an ordinary crisis sometimes occurs; but not oftener than if they had not been exhibited: and therefore such crisis cannot be said to arise from their exhibition.

The author then upon the whole does not know of any remedy tending to produce a crisis in fever oftener than it would have taken place, if no remedy whatever had been exhibited, (whether such remedy has a tendency to produce vomiting or not;) *excepting preparations of antimony and of ipecacuanha.*—Possibly it may be admitted, that the ancient Greek physicians for this purpose employed cold water internally, or the cold or warm bath, or some other remedy (with which we are now totally unacquainted), with good effect.

10*th.* *Semicupium* (or fomenting the lower extremities with warm water) is similar in some respects to the warm bath.—This practice has been used, especially when the patient is affected with *delirium in the second week of the disease.*—It is different from the warm bath; as it can be employed without greatly disturbing the patient, and in consequence without wearing him out by exertion.—When this fomentation of the lower extremities is employed; it should be applied in the evening. (The bottom of the bed clothes, under the patient's lower extremities, should be so covered as to prevent them from being moistened; and the covering may be taken away after the fomentation is no longer applied).—The *fomentation should be per-*

formed by means of flannel (or any thing which is a bad conductor of heat) made moist with water, and heated to about 100° of Fahrenheit's thermometer. The flannel or other substance so employed should be wrung out, so as to leave very little moisture in it: afterwards it is to be applied to the legs and feet, until it begins to cool.—As soon as the flannel begins to feel cool, it is to be removed; and fresh flannel is to be applied, moistened as before, with warm water.—The time of cooling will be different, according to the heat of the atmosphere; but at a medium, it will be about five minutes.—Fresh flannels are thus continually to be applied *for about half an hour*. The covering of the under part of the bed clothes is then to be removed; and the upper part to be brought over the lower extremities of the patient; who is afterwards to be left quiet.—It sometimes happens that a moderate sweat breaks forth; and the patient falling asleep, becomes much relieved. The author has seen a few cases, (but very few in proportion to those in which this practice has been employed,) in which a complete crisis has taken place; and then the patient has been freed from the disease. In several cases the patient has slept; and the delirium has been considerably relieved.—In the greater number of cases, however, no advantage has arisen from the application; yet as it hardly tends to exhaust the patient, it is worth while to employ it.

11*th*. Some, instead of moistening the flannel or other clothes, with pure water; have employed *mucilaginous substances dissolved in water*, (such as decoction of marshmallow root, &c.); and some have employed a decoction of poppy heads. The author's practice has not ascertained that any advantage has been gained by the addition of either.—In cases where there have been appearances of *putrefaction*, some have joined a small portion of vinegar: which (as far as the author can judge from the cases in which he has seen it employed) seems rather to have prevented the good effects of the application: but of this the author is not quite sure.

12*th*. An *inflammation* of an *Exterior* part of the body, in many cases, carries off diseases which have arisen in other parts of the body. Perhaps an inflammation of an *Interior* part may also carry off diseases which have taken place in other parts of the body:—for fever is one of the diseases which is carried off by an inflammation of either an exterior or an interior part of the body.

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[illegible] on the other hand, that it happens often
[illegible] takes place at the very beginning of the
[illegible] at the first or second paroxysm : and that such inflamma-
[illegible] of the disease, without any thing like the
[illegible] take place in the crisis of a fever : but that the

not affect the fever.---Thus, suppose in the second day of fever, a pleurisy should arise and cure the fever; then notwithstanding the fever be carried off, there will remain frequency of the pulse, foulness and dryness of the tongue, loss of appetite, great heat, urine remaining transparent when it has stood for several hours, &c. These appearances do not in the least constitute fever, but entirely depend on the pleurisy; and if the pleurisy be cured, (by bleeding for example) all these appearances will subside; (although the bleeding would neither have had effect on the fever, nor carried off any of its symptoms; if the pleurisy had not first arisen, cured the fever, and produced these symptoms).

The *knowledge* that fever might be cured *by exciting inflammation in some part of the body*, may have been derived from physicians observing that a fever was actually cured in many instances, when an inflammation arose in some part of the body; even when no application (as far as the physician could judge) was applied to excite it. The physician hence might think, that by applying something that would produce an inflammation in some part of the body, the disease might be carried off; and that an artificial inflammation might have the same effect with that, which had arisen in the fever itself (without any apparent cause excepting the fever). He might therefore produce an inflammation in some part of the body, by stimulating it; with a view of carrying off the fever.---Or perhaps that strong disposition in mankind not to wait the tracing of knowledge by experiment, might make physicians suppose, that the fever depended upon some noxious matter being diffused through the whole system; and that the application made might draw (like a magnet) the noxious matter into one part of the body; and produce an *inflammation* in that part, instead of a *fever* in the whole.

It is still *the opinion of many practitioners*, that when an inflammation carries off a fever, if it be such an inflammation as tends to terminate in *suppuration*; the matter that occasions the fever in the whole system, is accumulated in the inflamed part. When the abscess is formed and breaks, and the pus is evacuated; they still believe that the matter which first produced the fever is evacuated.--Other inflammations, such as arise in the skin for example, do not terminate in suppuration, but in a *blister* rising: (that is, the scarf skin separates from the true skin; and a fluid appears between them, which consists principally of the superfluous water and the neutral salts of the blood; sometimes along with a little serum; and sometimes also with coagulable lymph, which coagulates and gives some degree of solidity to the matter contained in the blister). The scarf skin afterwards breaks, and leaves the skin excoriated, till a new scarf skin is formed: but until that happens, a quantity of the superfluous water of the blood, together with the neutral salts, flow out.---In such case it has been supposed that the fluids (or whatever other matter it might be that occasioned the fever) continue to be *evacuated*; and that so the fever is carried off.

But the objections to this opinion are very strong.

First, the author in his first dissertation upon this subject, has endeavored to show that a fever is a disease of the living solids only; and that all the matter of the body, during the progress of many fevers, had exactly the same properties, as if the patient were in perfect health.

In the second place, supposing that any matter existed in the body which occasioned the fever; that matter must either be confined to some particular part of the body; or be circulated in the blood-vessels; or be thrown out by the exhalants and taken up by the absorbents, and through the absorbents circulated.—If it was lodged in any particular part of the body; an inflammation in another part might excite the action of the absorbents of the part where the noxious matter was lodged; so as to occasion it to be taken up and carried into the general circulation. If they did not take it up, it would remain in the part where it was at first deposited, and where it produced the fever; (as is evident to every person tolerably acquainted with the anatomy of the human body as it is now known): for, to bring the matter from a particular part where it produced the fever, into a part whose inflammation cured the fever; it is necessary that it should be absorbed, and carried into the general circulation.—But supposing the matter to be absorbed and carried into the general circulation; or supposing it to be originally blended with the whole fluids in circulation, so as to occasion the fever; the same argument will apply;—And it is as follows. If any matter be in general circulation, it is mixed minutely with the whole blood: for whether it passes through the blood-vessels only, or passes also through the exhalants into the cavities and absorbents; in both cases it is mixed with the whole blood returning from every part of the body, in the right auricle of the heart. (The motion which takes place from the right auricle to the right ventricle, mixes it still more thoroughly with the whole blood; and it is still more perfectly intermingled with the whole of the fluids, in passing through the lungs; and again in the left auricle and left ventricle: so that it must be blended most perfectly, and most minutely in the aorta; so as to be equally distributed through all the vessels. It passes through them indeed with such velocity, that no difference of specific gravity can prevent its being equally distributed to every part of the body.) If then there be no particular structure in any part of the body by which such matter may be caught; it will circulate equally through the whole body.—If there was any structure in any part of the body in its ordinary state, by which the matter of a fever could be caught, and produce inflammation; then it would be the inflammation of that part only which would carry off fever. But the inflammation of any part of the body indiscriminately, in many instances, carries off fever; and therefore there must be a change in the structure of the part in which the inflammation arises, in order to account for the matter's being caught in that part;—but no such change has been shown by any experiment, nor any cause of such change; so that we have an unknown thing, endeavored to be accounted for by a thing equally unknown.

We must therefore simply conclude, that an inflammation arising in any part of the body without any apparent cause, (excepting the fever itself,) in many cases terminates the fever.—*How* or *Why* this happens, not being as yet investigated: we are only led from this fact to inquire, whether *artificial* inflammations may not carry off a fever, as well as inflammations which *arise without any apparent cause.*—The author has seen in several instances inflammation, produced by applying stimulants to a part of the body, when a patient is affected with fever; carry off the fever entirely, in the space of twenty four hours.

When an inflammation is excited in the *exterior* parts of the body, so as to carry off a fever; it does not produce appearances similar to those which take place in the ordinary crisis of fever; but the fever simply ceases, the head-ach goes off, the tongue becomes clean, depression of strength leaves the patient, all the evacuations come into their ordinary state as in health, the patient sleeps, and his appetite is restored.—But though an inflammation produced in any exterior part of the body now and then carries off fever entirely; yet it has but seldom this effect. It only commonly alleviates the disease, or takes off some of the symptoms; it sometimes carries off headach or diminishes it; it diminishes, rarely carries off delirium entirely, if it has arisen; and so of the other appearances which take place in fever.

Since exciting an inflammation sometimes alleviates and carries off the symptoms of fever from *particular parts of the body*; if it should happen that one part of the body should be more affected in the fever, than the other parts; an inflammation excited *near* that part is more apt to carry off the *particular affection of that part*, than one excited at a distance. (If, for instance, there should be great pain in the forehead; an inflammation excited behind the ears is more apt to carry off that pain, than if it had been excited in the back: and if there should be great affection of the breast, an inflammation excited in the skin of the breast will be more apt to relieve the breast, than if it had been excited in the extremities.)

13*th*. There are *several substances which*, when applied to the skin, will *excite inflammation*; (viz. mustard seed bruised, horse-raddish, and many other of the class tetradynamia of Linnæus; many of the species of allium; euphorbium, and other resinous substances; as well as cantharides, ammonia, and many others).---Of these, modern practitioners have generally chosen to employ *cantharides* to excite inflammation in fever; and sometimes *mustard seed*.

If *cantharides* be powdered, and mixed with an oily or watery substance, and applied to the skin, they excite an inflammation in the skin: which is followed by a blister, in which the scarf skin is raised from the true skin, *so as to contain in it a Watery Fluid.* When the scarf skin is broke, this fluid flows out; and the same kind of fluid continues to ooze out from the skin for some time afterwards.

Upon examining this fluid, the author has *found it to contain water*; in which is *dissolved* natron muriatum, ammonia muriata, and ammonia phosphorata; with a little mucilaginous matter; and sometimes serum. The fluid oozed out therefore contains the superfluous water together with the neutral salts, commonly contained in the blood vessels; and also the putrescent mucilage.---Nothing, therefore, which is not commonly contained in the blood-vessels of a man in health, is found in this fluid.---But the superfluous water, neutral salts, or putrescent mucilage of the blood, were never known to occasion fever in a man in health. There is therefore no reason to suppose, that it is this particular fluid which occasioned the fever; or that this as an evacuation, is of any consequence, or in sufficient quantity to weaken the patient.---The *whole effect therefore* of the application of cantharides, so far as they produce *mere evacuation*, must be considered as of no consequence: it being the *inflammation only* which carries off the fever or its symptoms.

The juice of *cantharides is often absorbed* by the vessels of the skin, and carried into the general circulation of the blood; (as is evident from its stimulating and occasioning inflammation of the neck of the bladder, when cantharides are applied to the skin so as to inflame it):---And some have been of opinion that the juice of the cantharides so absorbed, produced some effect upon the matter which occasioned and kept up the fever.---Such opinion, however, is not founded on any experiment. That there is any peculiar matter in the body which keeps up a fever, has not been shown by any experiment; much less has it been shown that the juice of the cantharides has any effect upon such matter.---This opinion therefore, resting upon nothing more than an idle dream, cannot be made a foundation for medical practice.---Many animal poisons when absorbed and carried into the system, by their action upon the irritable parts, occasion spasms or involuntary contractions of the moving parts of the body.---The same effect is also now and then produced by the juice of cantharides, when it is absorbed and carried into the system. The author has, in several instances, seen subsultus tendinum, (in women especially,) and also more violent spasmodic affections, arise from the application of blisters in fever as well as in other diseases.---The absorption, therefore of the juice of cantharides, when it has this effect; so far from being useful, is evidently hurtful.---But this does not happen often enough to prevent cantharides being used.

Cantharides are therefore better employed to excite inflammation with a view to carry off or alleviate fever, than other stimuli; as they most readily produce inflammation, the inflammation produced by them is carried off more easily, and it is also more readily kept up (if that should be wished).

Sometimes indeed the absorption of their juice produces spasmodic affections; but these occur but rarely; and soon go off, if the cantharides be no longer applied, (generally in less than twenty four hours).---But cantharides are apt to produce *Strangury;* which yet *may be obviated or alleviated by employing mucilaginous medicines,* (such as gum arabic dissolved in barley water).---*How* these mucilaginous substances produce their effect in the last case, the author cannot satisfy himself; but that they do many times produce the effect is certain. The author has several times applied cantharides, so as to excite inflammation, to more than forty patients running. To the one half of them he has given mucilaginous substances, dissolved in water, and to the other half has given none: *when a much smaller number of those patients who took the mucilaginous substances,* were affected with strangury, than of those to whom the mucilaginous medicines were not exhibited.

14*th.* Some have preferred the application of *mustard seed,* or some other of the class *tetradynamia* and genus *allium,* to the feet and legs in cases of delirium in fever.—This practice seems to have arisen from the doctrine of derivation, (viz. to derive [or lead away] the matter as far from the head as possible;) which is mere hypothesis. In practice it is found, that if any particular part of the body be afflicted with a disease, an inflammation produced in another part carries off the disease more certainly, if the inflammation is excited near the diseased part; than if excited at a distance. (The proof of this, however, would be a digression too long to be entered into here, more especially as the author believes it generally acknowledged.)

15*th.* Suppose then that cantharides are preferred to excite inflammation in fever; the next question will be *in what cases such inflammation should be produced.*

Supposing that a patient is seized with a regular continued fever; and that the practitioner had no other means of putting a stop to the disease excepting by exciting an inflammation; or supposing that he has employed preparations of antimony, (or other medicines already enumerated), without being able to induce a crisis in the fever: or even supposing that there were other means of inducing a crisis to the fever or carrying it off immediately, without any critical symptoms; and supposing the fever was perfectly regular and affected the whole system equally: in *any* of these cases it is often worth while to attempt to carry off or to alleviate the fever, by exciting an inflammation (by means of cantharides) in the skin, *between and over the scapulæ, about six inches square.* If the fever should be carried off by this means; the inflammation may be suffered to go off, and the blister to heal.—The circumstances being the same, and the cantharides having been applied and an inflammation produced; if the fever should not be carried off, or in the least alleviated; the application of cantharides, or any other stimulant to produce inflammation a *second* time, rarely relieves the disease: and therefore it is not worth while to keep up or renew the inflammation of that part or any other part of the body. It will only wear out the system, and give the patient a less chance of sustaining the ordinary course of the disease.—Supposing the circumstances are the same, and the disease is alleviated, but not carried off; it may be advisable to excite a new inflammation after the first is carried off. If this new inflammation however should not carry off, or very much alleviate the whole disease; a *third* inflammation is not to be attempted. The constant stimulus kept up by the remedies employed to excite a third inflammation, and the inflammation itself, will wear out the patient so much; that no probable advantage arising from it can compensate for the mischief.—When a patient is going through the long progress of a fever, (which takes up perhaps one and twenty days, or even longer,) and when no medicine has been tried or none has been found capable of preventing its continuing its ordinary course; the practitioner, and much more the friends and attendants, lose their patience; the latter wishing that the practitioner would do something efficacious. In this case he is often compelled to apply cantharides to excite inflammation; notwithstanding the inflammation will probably be of no manner of use; but tend to wear out the patient. (The relations, nurse and by-standers, are satisfied with what they call a fine blister, and with the practitioner's doing something: which certainly ought to be no inducement to a practitioner to torment the patient with an additional disease; or to wear him out by producing additional action; and so give him a less chance of going through the ordinary course of the disease.)

It happens often that *some part of the body is more affected in fever,* than in proportion to the affection of the system generally.---This forms an irregularity in fever; but (not to have to recur to the excitement of inflammation again) the author means to notice it here.

---Sometimes there is a much greater *Head-Ach*, (that is, pain in the exterior part of the forehead, or all round the head,) than in proportion to the febrile affection of the other parts of the system. In this case, at the very beginning of the disease, cantharides applied *behind the ears*, (so as to excite inflammation) often relieve the head-ach; and sometimes carry off the whole fever. The sooner the inflammation is excited, the greater is its power; and therefore under such circumstances it is better to apply them so as to excite inflammation and occasion a blister, in the *first two or three days of the fever*.—Sometimes also *Delirium* arises earlier than we should expect from the other appearances of the disease. In this case an inflammation produced by cantharides (so as to occasion a blister to arise on the head after removing the hair, or on the skin of the neck, or between the scapulæ;) has sometimes considerable effect in diminishing, and sometimes in carrying off the delirium: and sometimes it even carries off the whole disease.---Sometimes likewise the *Breast* is more affected than in proportion to the appearances of fever in other parts of the body: (there being for instance sometimes a greater weight and oppression about the precordia, than corresponds to the appearances of fever in the other parts of the body; sometimes greater difficulty of respiration, attended with cough; and sometimes greater frequency of the pulse.) In all these cases, (when they arise from greater affection of the breast,) an inflammation excited in the skin over the sternum, has often given considerable relief; and sometimes has carried off the whole fever.---But it is to be remarked in *all these cases of topical affection*, that if the *first* inflammation or blister neither alleviates the appearances in the particular part of the body, nor diminishes the whole fever; a *second or third* inflammation (excited by cantharides or otherwise) is seldom useful; (but tends to irritate the whole system and wear out the patient; so as to render him unable to be supported through the remaining progress of the disease.)---If however the inflammation so excited should have given *considerable* relief; in that case, keeping up the inflammation, or (which is preferable) renewing it after it is gone off, is often useful.

Where inflammation is excited either to carry off the fever totally; or to alleviate the symptoms, when they have taken place in a greater proportion in one part, than in the whole system; the sooner it is excited, the more it is likely to prove efficacious: (excepting there should be great hardness, fulness, and strength of the pulse, and other appearances, rendering evacuation by bleeding necessary; but this is rarely the case.)---The practice however has rather been to leave the excitement of inflammation till later in the disease; (with a view perhaps to the practitioner's reserving to himself something to do to satisfy the patient and by-standers, rather than appear to allow the disease to go through its ordinary course.)

16*th.* It often happens that in the course of a regular continued fever, *Delirium* takes place. This delirium has been described in the former part of this dissertation, as of *two different kinds:* (the *first,* in which there is no appearance of affection of the brain, either when the patient is alive or upon dissection: and the *second,* in which, when the patient is alive, there is fulness of the vessels of the eye and flushing in the face; and on dissection, the vessels of the brain are much fuller of blood than they are found to be in men killed by accidents not affecting the brain.)---Both these species of delirium generally begin towards the end of the first week of the disease; but prevail principally in the second week.---In the *second* species, taking away blood (by opening the external jugular vein and letting five or six ounces of blood flow out) has diminished the delirium considerably; sometimes has carried it off entirely; and with it the *whole fever.* The same effects have been produced by applying two, or three, or four leeches, and allowing them to fall off of themselves; and *afterwards* applying cloths moistened with warm water, and allowing the wounds to bleed for four or five hours: (which last method is most efficacious.) In such cases of delirium, therefore, it is proper to take away a small quantity of blood.---The quantity of blood to be taken should be according to the strength of the patient. If his strength be much diminished by the fever or otherwise, the application of one leech to each temple is still of considerable use.---Taking away *blood from the arm or any other part of the body distant from the head,* is of no manner of use; as the author has seen in a great number of cases. (It was much the practice about the year 1760, to take blood from the arm in cases of delirium of both kinds; the practitioners believing that delirium arose from inflammation of the brain: but the author never saw any advantage arise from this practice.)---In delirium of the *first* kind, (where there does not appear any symptom of fulness of the vessels of the brain ;) the author has not seen any advantage gained by taking away blood *in any way* (from the head, or any other part of the body.)

17*th*. At the beginning of fever, it happens sometimes that very violent *pain takes place in the forehead ;* (which feels to the patient as if it affected the integuments of the cranium, and was merely external.) In this case the author has seen three or four leeches applied to the temples give considerable relief to the patient by removing the pain ; and sometimes they have carried off the whole fever. The author cannot conceive in what way such evacuation from the vessels of the head should be of use, when taking away blood from a distant part of the body is of none. Every man versed in anatomy must know, that from whatever part of the body blood is taken, it is the same blood ; excepting for the difference there is between arterial and venous blood ; (which are to be converted the one into the other in a few seconds.) The vessels of the exterior part of the head have very little connection with the vessels of the interior parts ; so that taking away blood from the temples by means of leeches can have very little influence on the circulation of the interior parts.---The reason why such topical evacuations by bleeding carry off or diminish the delirium or pain in the forehead, or even sometimes the whole fever ; is consequently wholly unknown to the author.---The only thing that he knows with regard to it is, that it is often effectual ; which was long ago taught to him ; and which he has found confirmed by repeated experience.

In this case (as well as in the application of *all* the remedies employed to carry off or relieve fever) *the effect is uncertain.*---Sometimes this topical evacuation is of very great advantage, or evidently carries off the fever without occasioning any of the appearances which take place in the ordinary crisis of the disease ; and not unfrequently it has no effect at all.---But as so small an evacuation can hardly be of any disadvantage to the patient, it is worth while to employ it in the cases enumerated.

18*th*. The most conspicuous appearance, which takes place in the crisis of fever, is *profuse sweating.*---Whatever substances therefore tend to produce profuse sweating, suggest themselves as remedies proper for carrying off the disease.---*Spices* are among the substances which tend to occasion profuse sweating; and have therefore been conceived to be proper remedies for carrying off the disease.---Indeed the great depression of strength, and great sense of coldness, which take place at the attack of fever; and when the coldness is gone off, the great depression of strength which continues; suggest the propriety of employing such powerful stimulants as pepper, cinnamon, nutmegs, capsicum, &c.; to prevent the patient from sinking under the disease.

The impression made by the appearance of weakness in the patient, and by seeing the fever carried off by a crisis in which profuse sweating takes place; has determined *all nations in the beginning of medicine* to employ such powerful stimulants as the spices enumerated, (or the most powerful they could procure) to produce a crisis: and practitioners have also employed them to *support the strength* of the patient.—It is not till medicine has subsisted for a long time in any country which has had no communication with others, or until the practice of other nations who have had much longer experience in medicine has been communicated to them; that such stimulants have been thrown aside; or the cool regimen (as it has been called,) has come into practice.—It is moreover to be observed, that many practitioners in medicine have been nearly or totally without that education, which could teach them the knowledge of the experience of those practitioners who went before them; and in consequence, on what ground the practice of medicine is founded. (Unfortunately, in all schools of medicine, the professors have been more anxious to infuse into the minds of their pupils some hypothesis; rather than a true history of the diseases they have treated of, or the efficacy of the remedies employed.)—It is not therefore at all to be wondered at, that the application of spices and other powerful stimulants, should often be re-introduced. The same depression of strength, which originally brought spices and other such stimulants into practice; and the profuse sweating which takes place in the crisis of the disease; have made untaught and unexperienced practitioners fall into the same train of thought and the same practice, that prevailed in the rude state of medicine; (that is, to keep up the force of the patient, or to bring on a sweating; supposing by that means to occasion a crisis in the fever).—This is called the *Warm Regimen*, and has been thus brought forward repeatedly.—For the same purpose, the patient has been kept in an air of a very warm temperature, and covered with bed clothes that are bad conductors of heat; and with the same effect.

It has been already shown, that *stimulating the body when there is depression of strength, but not actual weakness;* is a means of exhausting the powers of the system, instead of increasing them.—It remains to be inquired, whether *sweating* produced by simple stimulants, or keeping the patient in a warm atmosphere or loaded with clothes; will produce a crisis, or carry off the disease?—Sweating alone does certainly not carry off a regular continued fever. (Every practitioner, who has seen a moderate number of patients afflicted with regular continued fevers, must have observed sweating frequently take place without carrying off, or even producing the smallest alleviation of, the disease.)—In the *crisis* of fever, there is not sweating alone observed; but *an universal increase of the secretions*. The tongue becomes moist, and the crust which covers it is exfoliated; a laxity takes place in the intestines, and sometimes a considerable purging; the skin regains its healthy appearance, and is no longer contracted upon the muscles; and a relaxation every where occurs.---None of these *other* appearances happen when sweating is produced merely by *stimulants*, or keeping the patient in a *warm atmosphere, or covered with clothes* which do not conduct heat: (On the contrary, the mouth becomes more parched and drier, and the thirst is increased; the intestinal canal is more constipated; and the patient is far from being relieved from any part of the disease.)---If therefore the attempt to carry off the disease by stimulating, by means of the remedies enumerated or by keeping the patient hot; is viewed in any such light, it is to be totally rejected.

19*th*. It happens not uncommonly in the human body, that a *muscle contracts* without any volition in the man, or even against and contrary to his will; and this, when there is no apparent stimulus applied either to the part itself, or to any other part of the system. Although this contraction exists often in a very great degree; yet the two ends of the muscle cannot be brought nearer each other, because there is a counter-action: and in this case the body of the muscle generally swells, and occasions pain to a violent degree.---This contraction has been called *Spasm*.---This kind of contraction takes place not only where there are evident muscular fibres of a red color; but in all the other parts of the body which have a power of contraction similar to muscular contraction; (an act not at all depending on their elasticity). For example, the gastrocnemii muscles of the leg contract without any volition or against the volition, and without any stimulus being applied: so that the belly of each muscle swells, and is extremely painful: and in like manner the *skin* contracts upon the interior parts, and produces an uneasy or painful sensation, without the patient's volition and when no apparent stimulus is applied.---That there is some cause for such contractions taking place there can be no doubt; but it is a cause that to us is imperceptible.---*Such contractions* are called *Spasms*, properly and strictly speaking.---Contractions which *arise from stimuli*, (applied either to the part itself or to some other part of the body, or from affections of the mind); have been called likewise in a vague sense spasms.----The contractions which, strictly speaking, are called spasms, sometimes last for a very short time, (not above a minute or two,) and then go off; sometimes they continue longer, and produce affections of the system which have been fatal.---The spasm of the muscles of the leg for instance, (which is called the *Cramp,)* does not last above a minute or two: and then goes off, leaving behind a degree of soreness.—A spasm of the *annular muscular fibres of the intestines* continues for two or three days: producing extreme pain in the part; and more frequent contraction of the heart, and in consequence more frequent pulsation of the arteries; (so that they often beat more than one hundred and twenty times in a minute). A great depression of strength in the whole system comes on; a loss of appetite, difficulty of respiration, and derangement of all the other functions of the system, take place: and sometimes the effects prove fatal in a few days or even hours.

It has already been shown, that in *Fever*, there is contraction of the parts which have muscular power, generally; and that Fever often arises from causes perfectly unknown. Here is, therefore, a contraction in certain points, similar to what is called *Spasm*. Some practitioners have therefore considered *Fever as a Spasmodic Disease;* and the whole of it as consisting entirely of a spasmodic contraction of all the parts of the body which have a power of muscular contraction, (totally independent of their elasticity).---It is to be remarked, however, that contractions of the various moving parts is but a *part* of the disease: for there is (beside this contraction), a *depression of the powers of the body*.---This arises even before there is any appearance of contraction; and in many cases it is by no means in proportion either to the degree or to the universality of the contraction: and this depression continues in many instances when the contraction in many parts of the body is gone off.---There is likewise a *regularity in the attacks*, the hot fits, and the crisis of the disease (unlike to what happens in those contractions which are called spasmodic: these being almost always vague and irregular.)

There are *certain remedies* which, being applied to the stom- or skin, or some other *parts of the body* of the patient affected pasmodic contractions; in many instances will immediately ry off the spasm. In a spasmodic contraction of the muscles of calf of the leg; Ether poured upon the skin of the leg will (in ne cases) immediately carry off the contraction.

It is to be remarked with regard to these medicines, that they have something peculiar in taste and smell, which we have not sufficient words to express: for in truth we have but few words to express the sensations which we receive from the taste and smell. These sensations are at first, what we call *fetid* to the smell; and their particular odor has given a distinction to these remedies.---Those which we hence commonly call *antispasmodics*, are some plants of the natural class of ringent flowers, (by Linnæus called didynamia gymnospermia, such as mentha pulegium, &c.: (Some of the natural class of umbelliferous plants, (which come under the pentandria digynea of Linnæus,) as ferula assafœtida, &c.: Some plants which have compound flowers, (most of which are contained in the syngenesia of Linnæus,) as matricaria, &c.: Some medicines, the product of chemical processes, such as ether, &c.: And some found in animals, as musk, &c.---Most of these have been used to take off *Spasmodic* affections.

20*th*. And *several of them* have been used in fever *with a view of taking off fever immediately*, or of gradually *diminishing* the disease.

It has been already said that *ether and oleum vini*, dissolved in alcohol, sometimes produce sleep; in which sleep a crisis of the fever now and then takes place, and the disease is entirely carried off; (but this has been sufficiently treated of in the first part of this dissertation).

Resinous substances (such as galbanum, sagapenum, oppoponax, &c.) have sometimes been made use of; but rather as laxatives, than with a view of carrying off the disease. Assafœtida and gum ammoniac, (procured from the same class of umbelliferous plants,) though they have been much employed as antispasmodics in other diseases; yet (as far as has come to the knowledge of the author) have not been made use of with a view of carrying off or diminishing fever.

Musk has been employed, in many cases, towards the end of a regular fever, where the strength has been much diminished; with a view however, rather of stimulating and keeping up the strength of the patient, than as a medicine applicable to the carrying off or alleviating the fever itself. It certainly, as far as the author can judge from frequent experience, has been of little use in either supporting the strength or alleviating the disease.

Castor has been employed in many instances; but especially along with small doses of opium, (as has been described in the former part of this dissertation). The author thinks he can say, from his experience, that this has been done with very considerable advantage in assisting the opium in producing a degree of stupor and sleep, so as considerably to alleviate the disease.

Camphor, (a very peculiar substance produced by the crystallization of the essential oil of the laurus camphorifera, and found often in cavities formed by the cracking of the tree itself;) has been very much used; particularly in the second and third weeks of a regular continued fever.---This substance has been so much and so universally employed by the very first practitioners in medicine, (by those of the greatest skill, as well as reputation;) that the author's practice can be put in no competition with their opinion.---There are many things however, that make him dubious of its efficacy, either in alleviating or carrying off the disease.---In the *first* place, he has frequently employed and omitted it throughout the second and third weeks of a regular continued fever, in similar cases; without observing that the fever was more alleviated in the patients who made use of the camphor, than it was in those patients who did not make use of it.---In the *second* place, the dose which has been commonly employed in what is called the camphor mixture, cannot possibly amount to two grains; whereas the author has frequently exhibited to patients in regular continued fevers upwards of ten grains; and to patients in other diseases twenty, forty, and even sixty grains of camphor; without producing in most cases any sensible effect. Sometimes indeed, when given in the quantity of thirty grains and upwards; it has occasioned a little giddiness and stupor, (which however have soon gone off). He does not think, therefore, that in so small a dose it can be very efficacious.—*Again*; in a fever which is running on for two or three weeks, and in which no efficacious medicines have been employed with success; (but the disease has gone on in its ordinary course;) the flavor of camphor gives the appearance of the practitioner's doing something efficacious, or at least attempting to do something; while in truth he is regarding the progress of a fever pursuing its ordinary course. It is wearisome to the patient, as well as to the by-standers and to the practitioner, to conceive that no remedy of any efficacy can be exhibited: and this, the author suspects, has been the cause that camphor has been exhibited.—Its flavor however often disagrees with the patient's stomach, and produces sickness or nausea sufficient to prevent him from using *food* of sufficient nourishment.

21st. The author has all along considered a regular continued fever to be *similar to a regular intermittent*; (consisting of ephemeræ following after each other at certain periods of time). He has said that the difference between an ephemera and an intermittent is, that an ephemera consists of one attack of fever only; while a regular intermittent consists of several paroxysms of fever following after one another; (one paroxysm going off entirely, before the next paroxysm begins to take place;) the patient appearing in the intervals of the paroxysms nearly or entirely in perfect health, (as far as is sensible to the practitioner or the patient).—He has also said that the *Bark of the Cinchona* (being exhibited during the interval between the paroxysms of a regular intermittent) has the power of preventing a fresh paroxysm from making its appearance; so that the patient shall continue in perfect health. He has said also, that the difference between a regular intermittent and a regular continued fever is; that the paroxysms of the intermittent are terminated by crisis; but that in a continued fever a new accession takes place before the crisis of the former paroxysm begins.—If it be true then that a regular continued fever *differs* only from a regular intermittent, in consequence of the paroxysm of the continued fever not having reached the period of a crisis before a new paroxysm takes place; it might be supposed, that if a sufficient quantity of the bark of the cinchona was exhibited during a *previous paroxysm* of the fever, that it would prevent the next paroxysm from taking place; and give time for the present paroxysm to reach its crisis, or gradually subside.—This reasoning is so obvious, that many practitioners have given large doses of the bark of the cinchona, with a view of preventing another paroxysm from taking place in a regular continued fever; and so to carry off the disease. Many practitioners have likewise exhibited this bark, without any other reason than that if it cures an intermittent fever, it ought also to cure a continued fever. —Both these sets of practitioners have employed the bark of the cinchona in powder, to the quantity of one, two, or three ounces in twenty four hours; and in several instances with success.---The fever in this case sometimes has been carried off with an evident crisis; (happening however later than the crisis of the paroxysm in which it was given, would have taken place;) and the fever either has not returned; or its symptoms have gradually disappeared in less than forty eight hours; the patient having been restored to health.---When a young practitioner has succeeded with any medicine in carrying off a disease once, he always expects to succeed; (as Sydenham observed of himself when he employed the juice of the spina cervina in dropsy). In like manner, the exhibition of the bark of the cinchona having succeeded in some cases in carrying off a continued fever; these practitioners have been warm in their recommendation of it in all cases of the disease.---After a little time, however, most of them have left off the practice; finding it far from succeeding always: though if it had only succeeded sometimes, without any detriment to the patient; they would not have been prevented from employing it; (especially when they had committed themselves by testifying its efficacy in the strongest terms).--- The author himself has seen many cases in which this bark has been employed in a regular continued fever; sometimes with success;-- but it has much oftener failed. Where it has failed, the relaxations which began to take place in the disease, have been much diminished: the pulse has become more frequent in the morning, the head-ach more considerable, the skin drier, the tongue covered with a thicker fur, the costiveness greater, (if the patient was not thrown into a purging,) the oppression upon the precordia greater, and likewise the difficulty of respiration increased. On the following evening, the head has also been much more affected; (that is, the confusion and delirium have been much more considerable;) and the patient altogether worse than he probably would have been, if no remedy whatever had been exhibited; and there has been less chance of crisis in the fever, and it has been longer in wearing itself out.—In a *regular continued fever* therefore, the bark of the cinchona seems to have a greater chance of doing mischief, than good; where it is employed in large doses, with a view to carry off the disease at once.—In certain *irregularities of continued fever*, it may indeed be advisable to employ it, with a view of preventing the subsequent attacks of the disease; or in small doses, so as to support the strength of the patient; (but these considerations will be the subject of a future dissertation).

32*d*. The author has now enumerated the several classes of medicines which have been employed either to terminate a fever sooner than it would be terminated in its ordinary progress; or to alleviate the disease, so that it shall go through its progress with less danger to the patient, by rendering the symptoms less violent:—excepting however *some few classes of medicines, which he hardly thinks worthy of notice*.—Thus, small doses of *cerussa acetata* were employed by Gaubius; and *other medicines* have been recommended by other physicians, which have never (as far as the author knows,) come into general practice in any country or been in themselves useful.

The author has now also pointed out the appearances taking place at the beginning of a continued fever: shown, and those taking place during the course of the disease:—at what time, and how they take place; and how they continue; until the disease destroys the patient, goes off by crisis, or wears itself gradually out. He has also endeavored to point out what attentions are to be paid to the patient, on leaving the disease to pursue its ordinary course. He has also endeavored to show those means, which have been employed to shorten the disease, (so as to restore the patient to his pristine health); without leaving it to terminate itself by a crisis, or to wear itself out.

33*d*. One thing, however, is still left.---The author has said, that in a regular continued fever there is always depression of strength;

and that depression of strength sometimes rises to such a degree as to occasion *Putrefaction of the Fluids.*---This is certainly not the case in the greatest number of regular continued fevers; and does not happen perhaps once in an hundred cases of the disease in all its forms and varieties. The author, however, could not pass over this symptom in describing regular continued fever; because (according to his opinion) this appearance of putrefaction *always depends upon depression of strength.*---He therefore has described the appearance of putrefaction; and shown that if it did take place, it endangered the life of the patient in the manner which has already been pointed out.---As therefore symptoms of putrefaction have been described as taking place from depression of strength, (which last is a constant part of fever;) and as, when this depression of strength takes place in such a degree as to produce putrefaction of the fluids, the putrefaction endangers the life of the patient: it is necessary to *inquire* what means may be employed to *prevent* or *remove this symptom;* or to *counteract it,* so as to preserve the life of the patient.

All *Animal Solids and Fluids,* which are employed for any of the purposes of life, consist of a solid substance combined with water.---This solid substance the author has called by the generic term of *Animal Mucilage;* (and this acceptation of the term mucilage has now, at least in Great Britain, been almost generally adopted).

There *are* fluids contained in animals, which have either no mucilage in them; or so small a quantity, as to be in no proportion worth attending to; (not in the quantity of an hundredth part of the whole). *These,* however are all *Excrementitious Fluids;* which are no longer useful, and are finally to be evacuated.---The mucilages forming the solids and fluids along with water, and employed in the living body; have various properties.---Some combine with water so as to form *solids,* (such as the mucilage of the membranes, fibres, and cartilages of the body); some combine with water so as to form *fluids,* (such as the mucilage of the serum, coagulable lymph, bile, &c.;) some are perfectly colorless, insipid, and inoderous, (such as the true skin, the serum, &c.); some are colored, (such as the mucilage of the bile which is yellow, and the mucilage of the red particles of the blood which is red;) and some have a peculiar taste, (as the mucilage of the bile has a bitter taste).---All these properties remain perfect, while the different mucilages [to which they are annexed,] are performing their offices in a living body.

If any of these mucilages be taken out of the living body of an animal, and allowed to die; in a short time, (instead of retaining the properties which they had while in the body and alive); these properties are by degrees altered, and lost; and the matter of these mucilages acquires properties totally different from those which they had, while forming a part of the living body.

When either a solid or a fluid is taken out of a living body; there are several circumstances to which it is *exposed*, which are different from these in which it was placed when in the body of a living animal; (besides that it can no longer now be considered as alive). —It may be owing to some of these circumstances, in which the animal mucilage is placed when out of the living body, that, (independent of its losing its life,) such change in its properties may arise.---It is therefore *to be inquired*, whether these changes (which occur in the properties of an animal mucilage, when taken out of the body, and deprived of life;) arise from its being *merely deprived of life*; or from the other *new* circumstances in which it is placed?

Certain animal mucilages, immediately on being deprived of life; lose many of their properties. All the solid parts of an animal which are capable of contracting, are constantly contracted to a greater degree when alive, than they would contract from their mere elasticity: but this contraction ceasing when they are dead; these parts have always more length in a dead, than in a living body;—even when they *retain* all their chemical properties, (that is to say, the properties that distinguish them from any other species of matter); as well as all their mechanical properties.—This proposition admits, however, of some *abatement*. A solid capable of contraction, when an animal is alive and while exerting that power of contraction over it, so as to make it shorter; requires a greater mechanical force to break it, than if it were *not* made to contract: for it contracts by means of its particles coming nearer one another in the direction in which it contracts; but it breaks, by its particles going to a greater distance from each other in the same direction. But particles cannot come nearer to each other in one direction, and go to a greater distance from each other in the same direction, in the same instant of time: (or in other words, a living moving part, in consequence of its constant contraction depending upon life, will resist any *mechanical* power which attempts to break it.) As thus the *Mechanical* properties of a living solid differ in some respects from those of the same solid, immediately upon its death;---so likewise the *Chemical* properties of living solids or fluids, (considered as alive or as acted upon by the living solids contained in them,) differ from the chemical properties which they possess immediately upon their death.---Thus if a certain quantity of *kali purum*, (a scruple for instance,) be applied to any living solid in the body; it will unite with a certain quantity of the mucilage of the solids, (perhaps *half a drachm,)* and form a saponaceous substance: but if the same quantity of pure kali be applied to the same solid just when it has lost its life, it will unite with a much larger quantity, (perhaps *a drachm):* thus combining with a larger quantity in the dead, than in the living body.*---In like manner the *mucilage of the coagulable lymph*, contained in the blood-vessels, is either alive itself when so contained, or acted upon by the living blood vessels; and is in consequence perfectly soluble in water. But if it be extravasated into any cavity of the body, or be thrown from the blood-vessels out of the body, (although in all other sensible circumstances it be in the same situation as when contained in the blood-vessels,) it becomes insoluble in water; separates from the water in which it was before dissolved; and becomes *solid;* (or, according to the ordinary term, *coagulates*).---It is not therefore strictly true, that the solids and fluids of a living body *retain exactly* the Mechanical and Chemical properties which they had when alive, the instant they die.

There are some *Processes* which do not go on in animal mucilages when alive, in whatever circumstances they are; which yet go on under the same chemical circumstances, when the animal mucilage is dead.---When an animal mucilage is alive, it continues fluid, or soluble or not soluble in water; so as to form a fluid or a solid with the water with which it is combined; possessing an equal degree of softness or firmness if it be a solid, and an equal degree of adhesiveness or limpidness, if a fluid. And if it be a fluid; it continues of the same color, taste, and smell.---The moment that it dies, it loses these mechanical and chemical properties.---A mucilage, therefore, is *not acted upon* by the same mechanical and chemical laws when *alive*, as when it is *dead*.---As soon as an animal mucilage dies, it becomes subject to various *chemical changes*, (when put under certain circumstances) to which it was not subject when alive.

* Circulation in the living animal brings *new* portions of fluid to be acted upon in succession.

One of these processes is known by the name of *putrefaction*.---If a dead animal mucilage combined with water, (so as to form a flexible solid,) is placed in a heat between 45° and 150° of Fahrenheit's thermometer; putrefaction begins to take place. This happens most readily in a heat of about 100°, if the mass be moderately exposed to the air of the atmosphere; and particularly to that part of this air called pure or respirable air.---The *Appearances* which take place in a dead *Solid* under these circumstances, are, that the whole of it loses its firmness; (that is, it is pulled to pieces with less external force;) it feels more clammy to the touch; and if it be washed in water heated to about fifty or sixty degrees, a part of it dissolves.---If it be the *Red particles of the blood* which are in question, they become of a darker red color after standing for some time; and upon examining them with a microscope, some of them appear broke into two, and look like half moons; (and sometimes into several pieces like other sections of a sphere;) while some still appear spherical, but of less diameter; and by degrees they dissolve in the serum, giving it a reddish color. They likewise redden the mucilage of the coagulable lymph.---If the *Coagulable lymph* also be extravasated, or remains in the large vessels of animals after they are dead; it coagulates into a very firm substance; which by putrefaction becomes easier to break down, and has a clammy feel; part of it being rendered soluble in water, so as to form a fluid.---The *Mucilage of the serum*, which, when it is first taken out of the living body, coagulates, if heated to 165°, into a firm and solid mass; yet when it undergoes putrefaction, on being heated to the same degree, coagulates into a looser mass; and some of it not at all.---Similar changes take place, in the *other mucilages* of the body, when putrefaction just begins.---In like manner the *other fluids* of the body lose by putrefaction the properties which they had before putrefaction began.

If the putrefaction continues, the changes occurring, do not happen *at once* in the *whole* matter which is to putrefy.---In the first stage, the *whole* of a solid fibre does not at once become soluble in water, so as to form a fluid; but part of it becomes soluble in water, and the other part remains without in the least changing its properties. In like manner the whole of the red particles of the blood, are not broke down, into smaller particles; but some of them remain quite perfect, and have that form which they had when taken from the animal in perfect health, whatever that form may be; (for their form has been disputed, and has not been agreed upon.) In like manner part of the coagulable lymph coagulates perfectly; and another part of it does not coagulate upon extravasation. The serum likewise, in part, coagulates by heat, as firmly as if no change has taken place in it; while another part does not coagulate at all. The mixture of the solid fibres which become soluble in water, with that part of them which has not changed so as to become soluble in water, being perfectly uniform throughout; gives softness to the whole mass.---Thus a portion of all these substances putrefies at the beginning of the process; and another portion remains as perfect as it was before.

What has been above observed, is *similar to what happens in all fermentations.*---When a fermentation begins to take place, it does not take place in the whole mass at once; but in a certain part of it only, (in which part a change instantly takes place:) while in the other parts, no change whatever has happened. For example; if we have a hundred of the smallest integral parts of sugar dissolved in water, and place them in circumstances in which the vinous fermentation arises; at the first instant of the fermentation, one of the particles of sugar is converted into wine; the other 99 particles remaining sugar, (the same as before any fermentation took place.) Or in the first instant of the fermentation, two or more of the particles of sugar may be converted into wine; while the remaining particles of sugar continue the same sugar they were before.---Should the first of these suppositions be true, then in the *second instant* of the fermentation, two of the particles of sugar will be converted into wine, and 98 will remain perfectly in the form of sugar; and so by degrees the whole sugar will be converted into wine when the fermentation is finished; (but during the progress of it there will be a certain quantity of sugar; and another of pure wine.)---This is *proved* by taking the mass of mixture of sugar and wine, at any time during the fermentation; and distilling it, until the whole alcohol is carried over. Afterwards separate the alcohol from the water, so as to render it pure; and measure or weigh it. To the liquor remaining in the still, add a little quicklime; and mix with it a portion of whites of eggs: then expose the mass to a degree of heat sufficient to coagulate the whites of eggs; throw the whole through a filter; evaporate and chrystallize: and the sugar in it will be found the same sugar that was subjected to the fermentation; and its quantity will be in the inverse proportion of the alcohol obtained. (If there be half the sugar, there will be a certain quantity of alcohol; if a quarter of the sugar, half as much more of alcohol: as is well known to those who form vinous liquors for distillation.)

It might happen that the whole of that mucilage which, with the water, constitutes the *coagulable lymph*, might by putrefaction at once become *soluble* in water, so as to make a fluid solution: also that the whole *red particles* of the blood might become soluble in the serum, so as to form a dark reddish fluid:---and that the whole of the *mucilage of the serum* might lose the property of becoming solid when exposed to a heat of 170 degrees of Fahrenheit's thermometer: and yet no further change should take place. It might happen in like manner, that the *other* mucilages might only lose the properties that depended upon their *solubility* in water; and might still retain their other qualities.---This, however, does not take place if dead substances *continue to be exposed* to the circumstances of putrefaction which have been enumerated. Whether they were colorless, or of whatever color they were in the healthy living body; they gradually assume a brown color; which increases, until it becomes of a shade so deep, as to be conceived to be black.

In the progress of this process, substances begin to be extricated; which assume and retain the form of *Vapors* (in the heat and pressure of the atmosphere).---*One* of these vapors has a fetid smell, very similar to the smell of a compound of inflammable air and sulphur; having commonly been called a putrid smell: but experiments have not been made to determine whether it be actually a compound of inflammable air and sulphur, or not (as far as has come to the knowledge of the author). *Another* vapor extricated in this process is the gas, whose synonims have been already pointed out; (viz. fixed air and carbonic acid.) And *another* vapor is pure inflammable air, which does not appear till the end of the process.---The mucilages are partly converted into these vapors; but at last there begins also to be found in the mass (if examined) nitrous acid and muriatic acid, combined with lime and ammonia; and towards the end of the process, calcareous earth and ammonia appear combined with gas.---All these things have been ascertained by experiment.---It has been farther conjectured that *clay* likewise is produced.

Although the mucilages undergo these changes in the body of a *dead* animal, when kept in the *same* chemical circumstances in which they were in the body of a living animal; yet there are certain means of *preventing* them from going through the putrefactive fermentation after the death of the animal.---In the first place, no such change will happen, if they be placed in such a degree of heat as will freeze the water contained in them. Secondly, this change will not happen in the heat of 212°, or even in a heat somewhat below that degree: (though the degree of heat in which putrefaction will not take place, from the heat being too great, has not been exactly ascertained). In the third place, if no pure air whatever touches such animal mucilage; no putrefaction will occur in them. In the fourth place, although such air should touch it; if a certain pressure is made upon it by condensing the vapors surrounding it to a very great degree, putrefaction will arise much more slowly; (though it is not ascertained that there is a degree of pressure which will prevent putrefaction from arising altogether). Fifthly, if the whole water be separated from the mucilage by evaporation, no putrefaction will take place in it. Sixthly, if the water be separated from an animal mucilage, by its coagulating in consequence of losing its life; or if it be coagulated by heat, or by certain substances applied to it which have this effect, and if the water be afterwards squeezed out from it: when in any of these ways, mucilage is separated from water, and rendered insoluble in water again; the more perfectly it is separated from the water with which it was combined, and the more perfectly it is rendered insoluble in water; the more difficultly the putrefaction will happen: (and, if it be perfectly separated from the water, no putrefaction whatever will take place). Seventhly, though a dead animal mucilage be kept in that heat in which it would putrefy most readily, (which is nearly that of the human body): though it be exposed to the quantity of pure air proper for putrefaction, (as it is also in the human body;) though the air in which it is contained is neither too rare nor too dense to allow putrefaction to take place properly, (as it is not in the human body); though it has a proper quantity of water contained in it; and though its water be not separated by evaporation or by tanning, (neither of which happen in the human body without killing the part): though it should be in all these circumstances, in which putrefaction takes place most readily in dead matter: Yet if such animal mucilage should be kept *immersed* in an acid of any kind, or in an alkali, or in a metallic salt, or in gas, or in several other substances; it will not putrefy.---It is to be observed, however, that the quantity of these substances which are applied to it, to prevent it from putrefying under these circumstances, must bear a certain *Proportion* to the whole of the mucilage; otherwise they will have no such effect. (Let a *drop* of vitriolic acid be applied to a hundred weight of animal mucilage, and equally applied to all of it; putrefaction certainly would not be prevented. There must be an adequate proportion then of such antifermentative antiputrescent, to produce any sensible effect: for certainly 60 grains of concentrated vitriolic acid would have no effect on 100 pounds of animal mucilage, whether solid or fluid.)

Supposing then we could apply 60 grains of *vitriolic acid* to a human body (weighing 150 pounds) in which *all these circumstances of putrefaction are found;* we could not expect any sensible effect to arise from it; whether the body be *living or dead:* and the same thing may be said of all antiputrescent substances.---But 60 grains of concentrated vitriolic acid can never thus be applied to the *living* human body, excepting it be to the surface of the skin, or rather the scarf skin; for 5 grains of concentrated vitriolic acid (and that diluted with water) are as much as can be thrown into the stomach at once; and this cannot be repeated more than six times in the twenty four hours. The acid so thrown in, will be destroyed by the bile and otherwise: and also be evacuated: so that we cannot expect 30 grains to exist in the blood vessels at once; and certainly we can never get such a quantity into them as to be sensible to us in any experiment. We cannot therefore apply *vitriolic acid,* so as to prevent putrefaction in any perceptible degree.---The same reasoning may be applied to *any other* antifermentative antiputrescent; (such as any other acid, alkali, neutral salt, &c.)—Vitriolic acid however is among the most powerful substances for preventing putrefaction, in proportion to its quantity.---*Peruvian bark* is also capable of preventing putrefaction in dead animal matter (placed in circumstances in which it would putrefy, if the Peruvian bark was not applied to it). But while five drops of vitriolic acid may prevent a pound of dead animal matter from putrefying in a sensible degree, in circumstances in which it would otherwise putrefy; it will require 500 grains of Peruvian bark to produce the same effect upon a pound of dead animal matter. Now suppose that Peruvian bark gets into the blood vessels, (which is a question); it certainly never could get into them in such a quantity as to produce a sensible effect on 150 pounds of animal matter.---Therefore, taking it in this light we could not expect to convey into the blood-vessels such a quantity of any antifermentative antiputrescent, as to *prevent* the animal body from putrefying; *if it were not prevented by the effects of Life.*

Since the mucilages of the body of a *living* man are in all the circumstances most proper for putrefaction, *(i. e.* they are in the most proper heat, are exposed to be acted upon by a moderate quantity of pure air, are combined with a proper quantity of water, are in motion, remain often without change during a time in which they would putrefy if they were in the same circumstances in a dead body, and have nothing in them which prevents them from putrefying when dead ;) it must be concluded that the *Life* only prevents them from putrefying: or in other words, that it is as much a property of *living matter not to putrefy*, as it is of dead matter to putrefy.---Since then nothing can be applied in such proportion to them as would prevent them from putrefying, if dead; so nothing can be applied in such proportion as can prevent them from putrefying when alive.---Taking the argument in another view:---It may be true that such a quantity of vitriolic acid (or any other antiputrescent antifermentative) may not be able to get into the body, as to check putrefaction; and yet the living power of the body, although diminished, would in some degree still prevent putrefaction from taking place. Antifermentative antiputrescents might supply the loss of the living power; so that the remaining power of the life, together with the antiputrescent power of the antifermentative, might be sufficient to prevent any putrefaction. But the small quantity of the antifermentative power that can be applied in proportion to the mass of matter that it has to work upon: makes it extremely improbable that it would (even taking the argument in this view) at all retard putrefaction.

A certain degree of putrefaction of the fluids, in a living (and otherwise healthy) body; may be brought on by a person's eating salted animal food, with farinaceous matter.---This degree of putrefaction forms a disease which has been called *Sea Scurvy*; although it happens equally at sea or on shore, when such food is made the only nourishment). In this case *Depression of strength* is the first symptom; arising evidently from food disposed to putrefy: (for if the patient lives on food not disposed to putrefy for two or three weeks, the depression of strength, the appearances of putrefaction, and the whole disease are carried off.)—In this case, neither vitriolic acid, nor Peruvian bark, nor any other antifermentative antiputrescent, has any effect in taking off the putrefaction; though they can be applied to the *food* in the *stomach*; and can therefore act upon it in a much larger proportion, than on any other solids or fluids of the body.—It is only *native vegetable acid*, and the looser vegetable substances which we commonly call *greens*, (which are capable of being *digested themselves*, and in their digestion rather tend to become acid than to putrefy;) that carry off the depression of strength, the appearances of putrefaction, and the whole disease.

When putrefaction of the fluids therefore arises solely from the *depression of the powers of the body*, in consequence of using improper food; antifermentative antiputrescents have no power of preventing putrefaction.—We can therefore have little expectation of their preventing putrefaction, when arising from depression of strength in *fever*.—Neither are vitriolic acid, Peruvian bark, &c. found actually to prevent putrefaction, when it arises from the *depression of strength* in a violent fever.

Moreover it has been conceived, that not only putrefaction might be prevented, when it arose in the solids and fluids of the body; but likewise that the parts that had already undergone putrefaction to a certain degree, might be made to *Return* again to their sound state.—If animal solids putrefy, the first appearances are, that they acquire an adhesiveness to other substances greater than they had before; they become of a greenish or brownish color; emit a fetid vapor; and are more soft and flabby. If they be taken in this state, and diluted vitriolic acid be applied to them; they lose their adhesiveness, become firmer, regain some of the color belonging to them when sound, and lose their smell.---It has been thought in this case, that not only farther putrefaction was *prevented*; but that the part was *brought back* to the state it was in before the putrefaction began to take place.—On considering the argument, however, this by no means appears to happen. An acid decomposes the fetid vapor, so as to *take off its fetor*; but it does not reconvert the fetid vapor into the solid from whence it was produced * * * .

That the *Destruction of the fetid vapor* is a different process from the solid's re-acquiring its firmness, is evident; because the solids may re-acquire their *firmness* without the fetor's being diminished, merely by applying an infusion of oak bark to the matter become soft by putrefaction.—The action of the infusion of oak bark is in this case applied to the part that has *not* been changed by the putrefaction; which it coagulates, (as it always would have done:) but upon the part already changed by the putrefaction, it has no effect.--- (For as before mentioned, not only fermentation, but also solution and other chemical processes, do not take place in every particle of the mass that is acted upon, at the same instant; but progressively.) * * * * * * Thus, if a piece of lime be thrown into muriatic acid; a part of the acid immediately combines with a part of the lime and forms a compound (viz. calx muriata) whose properties are perfectly different from the properties either of the acid or of the lime; the remaining acid and the remaining lime retaining each its own properties: there being after the first instant of the operation, in the whole mass, lime, muriatic acid, and calx muriata. Again, suppose *ferrum vitriolatum* (a compound of calx of iron and vitriolic acid) to be put into a retort with a receiver adapted to it, and the retort heated to a certain degree; the heat separates the acid from the calx; *but not at once:* for at the beginning of the operation, a part of the acid distills over, a part of the calx remains behind in the retort, and along with it is left a part of the ferrum vitriolatum, (not decomposed, but retaining the properties it had before the operation.)—So if a *muscular fibre* be placed in the circumstances in which it putrefies; the whole does not putrefy at once; but part putrefies, and is converted into a mucilage soluble in water, and not coagulable; and if the putrefaction go farther, into fetid vapor, &c.: a part remaining *coagulable* by oak bark. Thus the oak bark renders the part that was unchanged, much firmer, by coagulating it; but is far from restoring the whole mass to what it was before. The coagulated (or tanned) part has not now the properties the muscular fibre had before it began to putrefy; but is a substance having properties totally different, excepting as to firmness; (the fetid vapors, and other vapors remaining the same, as if no oak bark had been applied.) In the cases therefore where oak bark, or any such substance, has been applied to give firmness to animal substances, which have become soft by putrefaction; that firmness arises from the coagulation of the parts yet unchanged by the putrefaction: (an [illegible]ot from the parts, which have gone through any stage of putr[illegible] returning to their former state and former properties.)—[illegible]n acid therefore or any other such substance coagulates, a[illegible]ers firm a mass which is already putrefied in part; it does [illegible]ore it to its former state.—When it *combines with or decomp*[illegible]*he fetid vapors,* it does not unite with them, so as to reproduce the substances that were changed into such fetid vapors; nor does it separate these substances from the putrid vapors, so as to restore them to their pristine state.—Neither coagulating substances, therefore, nor substances destroying fetid vapors, *Restore* putrid substances to what they were before.

Upon the whole therefore no expectation can be had of *preventing* putrefaction (where there is disposition to putrefaction) by any remedy that will either produce or prevent any chemical process; much less can there be any expectation of *restoring* substances to their former state (when they have actually putrefied) by any such remedy.

The only means, therefore, of preventing putrefaction in fever are: *first,* the carrying off the fever by the means already pointed out. (When, therefore, symptoms of great depression of strength; such as great loss of muscular power, great oppression about the precordia, sighing, a feel of softness in the pulse, &c. arise at the *very beginning* of a fever; a practitioner should be particularly anxious to *produce a crisis* by antimonial preparations, &c.)—Secondly, we must avoid applications which diminish the force or depress the strength of the system. (*Evacuations* therefore that are unnecessary, as bleeding, &c.; should be carefully avoided; and the patient should be kept *quiet* in bed; with his *mind* as much at ease as possible, &c.)

If any of the parts of the body have *already* putrefied, the only way by which the putrid matter can be got rid of; is to suffer it to pass through the *Excretories* of the body.

24th. If with strong symptoms of *putrefaction* of the fluids, an *hemorrhage* should take place either from the nostrils or mouth; or if blood be vomited up, or comes from the lungs; or if purging of blood should take place, or a hemorrhage should happen from the womb, or if blood comes along with the urine: (even if the hemorrhage should only be in small quantities;) the patient is in the *ut-*

most danger. Should effusion of blood therefore take place in any of these ways; in such case, (without attending to any thing else,) every means should be attempted to stop such hemorrhage.—The most powerful remedy for stopping hemorrhage arising from laxity or putrefaction, is the bark of the cinchona; which should be given in powder to the quantity of an ounce in twenty four hours; *together* with acids and other astringents. (The following form or something similar, may be exhibited:

R. Decoctum corticis cinchonæ, libras duas cum semisse;
Rosæ rubræ exsiccatæ, unciæ dimidium;
Acidi vitriolici diluti, drachmas quinque.

Decoctum fervens rosæ affunde, in vase vitreo; dein adde acidum vitriolicum dilutum; et macera per horam dimidiam. Liquorem frigefactum cola.

R. Colaturæ uncias duas;
Pulveris corticis cinchonæ, drachmam unam.
Misce. Fiat haustus, quarta quaqua hora sumendus.)

Although, when hemorrhage arises *in consequence of putrefaction*, all other considerations must give way to so dangerous an accident; yet hemorrhages from *other* causes must *not alter* our other attentions during the fever.---*Sometimes an active hemorrhage* from the nostrils or another part, carries off the fever in the same manner as an inflammation; although the hemorrhage be but in a small quantity. If a *large hemorrhage* should arise without symptoms of putrefaction, (whether it relieves the fever or not,) it may be prudent to check it by infusions of *roses*, (prepared according to the London Pharmacopœia,) given to the quantity of two ounces every four hours: but the *bark* of the cinchona is *not* to *be* exhibited, unless it be proper from other views in the disease.

The author comes now to treat of the care of patients in a *CONVALESCENT STATE*, after a Regular Continued Fever.

If a crisis should arise at the beginning of the *first week* of a regular continued fever, or *before the sixth day*; the disease most commonly returns, and becomes an *intermittent*.

The author must soon again take notice of the supposition, that there is some matter to be altered in the progress of a fever before it can be expelled from the system; which he has already shown is only a supposition, and unsupported by any experiment, (no man having ever seen, smelt, or tasted such matter:) though it has often been inculcated, that such matter must be subdued, by allowing the intermittent to go on.—If however a crisis should take place in the first week of a regular continued fever; and if the crisis should be perfect or nearly so; (that is, if there should be considerable sweating, if the tongue should be clean or nearly so, if there should be a lateritious sediment in the urine, if the costiveness should be gone off, if the head-ach should have ceased altogether or nearly, if the pulse should be less than 80 strokes in a minute, and tolerably free;) the author is warranted *from Experience* to say, that the bark of the cinchona should be given in powder immediately after the crisis, (which is commonly about six or seven o'clock in the morning,) to the quantity of a drachm every hour; and continued at least for 48 hours.—By this practice, it often happens that a return of any paroxysm is prevented, and the patient is freed from the disease.

If the crisis has arisen without the exhibition of any medicine, (as the author has supposed in what is said above); if the crisis has been nearly complete, and the bark of the cinchona has been employed as has been represented; and if notwithstanding this, a fresh paroxysm should return: the case must be referred to what has been said in treating of regular tertian intermittents, or will be said in treating of irregular intermittents (in a future dissertation).

Supposing that preparations of antimony, ipecacuanha, or any other medicine (producing symptoms similar to those which arise in the *ordinary crisis* of a regular continued fever) have been exhibited; and that they have actually produced these appearances which take place in a crisis; and that there is a freedom from the symptoms of fever equal to that which has already been described: in this case, the bark of the cinchona should *also* be employed as has been described.—Supposing that in the *beginning of a regular continued fever*, there should be peculiar pain in the forehead, or over the whole head externally; and that either by applying leeches to the temples, or by otherwise making topical evacuations from the head by bleeding; or by blisters applied in the first days of a fever behind the ears, or otherwise to any part of the head; the pain has ceased, and all the other symptoms of the disease have gone off: although no mischief would undoubtedly arise from employing the bark of the cinchona; yet (as far as the author's observation goes) the fever has not returned, though this bark was *not* employed.

If in a continued fever no medicine has been employed, and a crisis should take place in the first week of the disease, but that crisis should be very incomplete; (that is, though about four or five o'clock in the morning, the patient should fall into a sweat, even rather profuse; and there should be a lateritious sediment in the urine; but the head-ach should not be much abated, the tongue should be still foul, and the depression of strength remain very great, and the other appearances of fever still continue without great abatement:)—it then becomes a *Question,* whether the bark of the cinchona should be employed in large quantities; so as to try to prevent a *Return* of a fresh paroxysm of the fever?—The *Decision,* in the author's opinion, depends on the *following circumstances:*

In the *first* place, this *seldom* happens in a regular continued fever in which the symptoms of the fever come on *slightly at first.* If it *should* so happen, (as far as the author's experience goes), it is best to employ the bark of the cinchona in the manner described: for though it often fails in preventing the recurrence of a fresh paroxysm of the disease; yet hardly any mischief arises from the paroxysm. There is in this case even a chance of terminating the fever immediately, so that the patient shall recover his health; for which reason it had better be employed.—In the *second* place, if a regular continued fever should attack a patient at once with *violent symptoms;* (such as great sense of coldness followed by heat, returning alternately for twenty four hours or until the evening following; and if there should be great head-ach, great depression of strength, anxiety, &c.;) and no medicine has been exhibited which produces appearances *similar to the ordinary crisis of fever;* and if an *imperfect crisis* should happen in the *First* week of the disease: in this case, neither the bark of the cinchona nor any other medicine acting in the same manner should be employed.—In this case, it is proper to employ preparations of antimony or other medicines of similar effect, (in the manner that has been already described,) when it is wished that they should exert their most powerful effects to carry off the remaining symptoms of the disease. When the *bark* of the cinchona has been exhibited, *sometimes* no fresh attack of the fever has taken place, and the remaining symptoms of the first stage have gradually disappeared. But *much more frequently* the disease has returned, and continued as if no such imperfect crisis had happened; and the whole fever has been more severe: or the appearances which have remained, have continued and gradually increased, and formed a new fever, (which has lingered out for several weeks): or lastly the patient has been relieved from the fever, but continued in a languid and morbid state for a great length of time.

This observation is one of the grounds on which the author has formed his opinion, that the bark of the cinchona prevents the *return* of fever; but does not take off a fever which is *present*.---Preparations of antimony on the other hand, (and other remedies having the same effects,) exhibited in such imperfect crisis in the first week of the disease, often *remove* the remaining appearances of fever; so that the patient is restored to health.

If, on exhibiting preparations of antimony or ipecacuanha or any other medicine of the same class, a *very imperfect crisis* should be produced in the *Second week* of a regular continued fever; the same method is to be pursued, as if the crisis should take place when *no remedy* has been employed.---If no medicine has been employed tending to produce a crisis in a regular continued fever, and a crisis has taken place in the second week of the disease; yet if the crisis be tolerably perfect, (that is if a considerable sweating should take place in the morning, if there should be lateritious sediment in the urine, and if the tongue should become tolerably clean; though some degree of head-ach should even remain, and the pulse should continue frequent even to ninety or an hundred strokes in a minute, with some other febrile symptoms;) the bark of the cinchona should be employed in as *large* doses as the patient's stomach will bear. (The fever is not near so apt to return, or to be prolonged, as it is when such a crisis takes place in the first week; and therefore it is better to employ the cinchona, or other medicines of that class; than preparations of antimony, or other medicines which have similar effects).---The same thing is to be said if a crisis has been produced in a regular continued fever *by means of preparations of antimony*, &c. in the second week of the disease; or if the fever has been carried off in the second week by any *other* means.—If a crisis should take place on the *fourteenth day or any day afterwards*, and the fever should be diminished by it, although not carried off; the appearances of the fever continue almost always to diminish until the disease goes off: so that it is needless to employ any remedy with a view of preventing its return.

The great disposition in a fever to return, if a crisis should take place in the *first* week of the disease; the less disposition which it has to return, if a crisis should take place in the *second* week; and the very little disposition which it has to return, if a crisis takes place in the *third* week:---most probably was the foundation of the idea which has prevailed (from the earliest practitioners down to the present time,) that there was some *matter introduced into the body* which required preparation or concoction (that is, that should be in some way altered,) in order to be *evacuated*; before a fever could be got rid of.—When however it comes to be considered that this (though it be a possible explanation of this appearance) is by no means supported by any evidence; the author does not think it worth while to discuss this argument. (It would be necessary for him to write a great many volumes to refute the various opinions, which have been admitted into the theory of medicine as true, because they are possible.)

When a crisis takes place at any time of a fever, *Purgatives* have often been employed with a view of evacuating part of the *matter* which occasioned the fever, that may have remained.—The author has already said, that there is no reason for supposing any such matter to exist; and that as the contrary is mere hypothesis, purgatives, by evacuating such matter, cannot prevent a fever from returning or any mischief from happening.—A purgative has no power of carrying *one fluid out of the blood-vessels more than another:* it can only contribute, therefore, to the clearing the body of any particular substance, by occasioning a quicker change in the *whole* fluids.—Purgatives would indeed evacuate *all* those which are present in the body; so that a fresh set of fluids would be formed more quickly. The serum, coagulable lymph, and red blood, and all the healthy fluids, would be sooner *re-produced* from the food, after those present in the body, are evacuated by purgatives, together with noxious matter; but it would be long before such a change would take place, and the noxious matter be got rid of. (Supposing there was mixed with the whole blood some extraneous matter which amounted to an hundredth part of the whole; and supposing that one dose of a purgative evacuated the hundredth part of the whole fluids; it would take more than fifty doses of purgatives to evacuate the half of the extraneous matter; for no experiment has hitherto shewn, that purgatives have any specific power of taking away one matter more than another.)---It might be supposed indeed that purgatives would evacuate the *more fluid* parts of the blood; (and therefore would carry off the serum and superfluous water). If this was the case, after purging every day for several days, upon opening a vein and taking away a quantity of blood, there would be less serum and a larger proportion of coagulum. But the contrary of this is found to be the case: there being actually less coagulum in such case, and *more* serum and superfluous water.---It is commonly believed, in like manner, when *mercury* has been exhibited so as to produce salivation, that by exhibiting a purgative the mercury is carried off; and the salivation made to cease. The author therefore chose forty patients as nearly similar as could be, who had been cured of syphilis by mercury exhibited so as to produce salivation; and in whom in consequence the salivation was wished to be carried off. To twenty of these he exhibited purgatives, and to the other twenty no medicine whatever: but the *salivation ceased* much sooner (upon an everage) in the twenty to whom *no* medicine whatever had been exhibited, than in the twenty who used purgatives.---It does not appear, therefore, that purging has any power of carrying off any noxious matter remaining after a fever: *first* because there is no evidence of such noxious matter existing; and *secondly*, if such noxious matter did actually exist, there is no power in a purgative to carry it off.---Moreover, *Purgatives* have a considerable tendency to *re-produce* the disease, (or occasion relapses;) as the author has seen in many instances: (and there are several other instances of this on record, though not related with that view: for example: De Haen relates a case, where he says, that a fever returned; though there was a perfect crisis about the end of the second week, *notwithstanding* purgatives had been exhibited: but in that case, the purgatives evidently re-produced the fever.)---Purgatives are, therefore, never to be employed after the crisis of fever; excepting there should be *costiveness*; (and in that case only so as to produce one evacuation.)

If a crisis should happen in the first or second week of a fever, the patient is never so much reduced in his strength as to require *Food of great nourishment.*--After such a crisis, it is much better to confine him for several days to such food as he employed during the fever: and especially he should avoid all solid animal food; (more relapses having been observed by the author to arise from using solid animal food too soon, than from any other cause.)---If a crisis should happen in the *third* week of a regular continued fever, still, although the patient be extremely weakened by the disease, no solid animal food is to be given; as the *cause of the weakness* (namely, the exertions in the fever) has ceased.---Very moderate nourishment in proportion to what mankind commonly use in cultivated countries, together with sleep, (which in this case is generally easy and refreshing;) will sufficiently recruit his strength. He should therefore *for many days refrain from solid animal food;* (the use of which, the author has already observed, he has found more productive of Relapses than any other cause whatever.) (For the knowledge of the quantity of food which men use in civilized nations more than is necessary, the author begs leave to refer to his Treatise on Digestion.)

If the patient is thus to avoid solid animal food when a perfect crisis takes place in the *third* week, (although he has been much exhausted:) such food is much more to be avoided after a crisis has taken place in the *first or second* week; (when the patient is not only less exhausted, but when there is likewise greater danger of a relapse.)---If no crisis should take place in the first or second week of a regular continued fever; and if in the third week the fever should gradually diminish, by critical symptoms taking place one after another; (that is, if the tongue has been covered during the whole of the disease with a mucus crust, which now begins to leave the edges of the tongue, or exfoliates in small pieces all over the tongue; or, after the tongue has had a raw appearance when moist, and a glassy one when dry, if it begins to be covered with its ordinary mucus, and is putting on its common appearance; if the pain in the forehead is gradually ceasing or entirely gone off; if there be a lateritious sediment in the urine for a day or two, which afterwards ceases; if the skin becomes gradually moist, or a slight sweat should arise about four or five o'clock in the morning; if the costiveness should go off by degrees, or there should be some laxity in the intestines; if the pulse should become slow, or if it should fall at once to between eighty or ninety strokes in a minute; if the skin should return gradually to its ordinary color;)---if these appearances of crisis should appear after one another; or if this should begin in a slighter degree at first, and gradually become more conspicuous:---the patient must still be absolutely forbid the use of *solid* animal food, for *Many Days* after the fever has begun to subside;---or even the use of *any* food in too great a quantity; especially at once.

If a crisis should take place in the first or second week of a continued fever, and should be very perfect; the patient should not be confined to his *bed* during the whole twenty four hours; but should be covered with his ordinary *clothing*.---But if the crisis be incomplete, and several of the symptoms of the first stage still remain; it is better that he should be *confined to his bed* until such appearances go off.---If a complete crisis should take place in the third week of a regular continued fever, or if several critical symptoms should take place; it is better that the patient should be covered with his ordinary clothing, *even supposing* that he is obliged to lie upon his bed; (excepting where the weakness is so very great, that he is apt to faint on being placed in an erect posture, or on any extraordinary exertion.)---If the disease should begin gradually to diminish in the third week; when the diminution has become considerable, it is better that the patient should be covered with his ordinary clothing during the *day time*.

The *next Dissertation* will take notice of the irregularities and accidents which happen in intermitting and remitting fever.

A

FOURTH DISSERTATION
ON
FEVER;
CONTAINING
THE HISTORY OF, AND REMEDIES
TO BE EMPLOYED IN,
IRREGULAR INTERMITTING FEVERS.

—oo—

PRINTED IN 1802, IN LONDON.

FOURTH DISSERTATION, &c.

Many authors and practitioners have thought the *Tertian* type of fever the *true type*, and described it as such :—supposing, in other words, that *every* intermittent would recur at the end of forty eight hours, if it were not prevented by some Accident.

Whether this be the case or no, the author (having described a regular tertian, and the manner of its treatment,) proceeds in the *next place* to endeavor to lay down the history and manner of treatment of *those intermitting and remitting fevers*, which *Vary* in their type *from the true tertian*.—(He means by fevers observing the tertian type, those which return from the end of *forty six to fifty hours.*)

In the *first* place, the most obvious distinction between the types of fevers, (or the most obvious *variation from the tertian type,*) is, that some fevers *recur at the end of twenty four hours* after the beginning of the former paroxysm.—In these, each paroxysm goes through its course (as in tertians) in eight, ten, or twelve hours.—These fevers have been called *Quotidians.*

In the *next* place, in some intermitting fevers, the paroxysms return at the end of *seventy two* hours from the beginning of the former paroxysm.—In these each paroxysm continues for eight, ten, or twelve hours ; (in the same manner as in a tertian.)—These have been called *Quartans.*

In these diseases it is again to be remarked : *First,* in quotidians, that the return of the paroxysm is not absolutely fixed to twenty four hours : Nor secondly, in quartans to seventy two hours.—Quotidians may return at the end of twenty two hours, or from that to twenty six hours ; (although the return is more confined, than in tertians ; seldom exceeding the bounds of between twenty three and twenty five hours).—In like manner, the return of quartans does not always take place exactly at the end of seventy two hours; but from seventy to seventy four hours. (There is however a greater latitude than in tertians; quartans sometimes returning from sixty nine to seventy six hours.)

In *both* these cases, the paroxysm may return constantly *Sooner* than twenty four or seventy two hours: (for example, constantly two hours sooner.) These are called *Anticipating* quotidians and quartans. In these (the return being two hours sooner in every paroxysm) the beginning of the paroxysm may take place at *any time* of the day or night.—In like manner, each paroxysm may return two hours *Later* than the former paroxysm. These are called *Retarding* quotidians and quartans, (in the same manner as retarding tertians); and their paroxysms may take place *at any time* in the day or night.

It may *also* happen, that subsequent paroxysms of a *Quotidian* may sometimes take place at twenty four hours after the beginning of the former paroxysm; but sometimes at twenty two hours; or sometimes at any time between that and twenty six hours after the beginning of the former paroxysm: (so as to wander sooner or later from the twenty four hours, but always to be within two hours of the twenty four:) and after this manner the paroxysms will always *continue to return*.—In a *Quartan* the same thing may also happen. (That is, supposing the quartan type should be such, as that the return of the paroxysm ought to be at noon; the paroxysm may nevertheless return at any time between ten and two;) always returning therefore within two hours of the *same time of day*.—To such quotidians and quartans no particular name has been attached: They have generally been called *Regular* quotidians and quartans; as if they had returned exactly at twenty four or seventy two hours from the beginning of the former paroxysm.

In *anticipating and retarding quotidians and quartans, the same indisposition to return in the Night Time,* (which has been shown to happen in regular tertians,) is found to take place.—That is, if in [an *Anticipating*] quotidian or quartan, the first paroxysm should take place at noon; the second at ten o'clock in the morning; the third at eight; and the fourth at six: it often happens that the fifth paroxysm, (instead of taking place at *four in the morning* of the next civil day,) takes place at *six in the evening* of the day in which the fourth paroxysm happened.—So also if the first paroxysm of a *Retarding* quotidian or quartan should happen at noon; the second at two in the afternoon; the third at four, the fourth at six in the evening; and the fifth at eight; the sixth (instead of taking place at ten in the evening) makes its appearance at *six in the morning following;* in the same manner as in a regular tertain.

Suppose it should happen, that in a *Quotidian*, the paroxysms should take place at the end of twenty four hours, or two hours sooner or later; or in like manner in a *Quartan*, the paroxysms should take place at the end of seventy two hours, or two hours sooner or later, (so as to return nearly at the same hours of a civil day;) and that each paroxysm should occupy the space of eight, ten or twelve hours, from the beginning of the accession to the end of the crisis:—the only *differences in the history or manner of treatment*, from what has been already laid down in treating on tertian fevers, are what follow, *(provided* the disease remains a quotidian or quartan during the whole of its course).

A *Quotidian* has a *shorter Course* if left to itself, than a tertain:—(that is, if a quotidian be left entirely to itself, the intermissions become more perfect in ten and thence to fourteen days; when they become generally complete: and if the disease be perfectly regular, they continue complete from three to four weeks: afterward the attacks become less violent, and the disease gradually goes off;) so as entirely to leave the patient in *about ten* weeks.---Whereas a regular *Tertain*, going through its natural course, seldom leaves the patient in *less than fourteen* weeks.---On the other hand in a *Quartan*, (if the paroxysms from the beginning return from the end of seventy to seventy four hours,) the intermissions seldom become complete till about three weeks. If they continue to return at that period of time through the whole course of the disease; the intermissions afterwards become longer and are more perfect. The disease however is apt to run *five months before there are any signs of abatement;* and it is often *six, seven or eight months* before the disease ceases entirely.

Supposing that no accident should take place during the ordinary progress of a *Quotidian* or *Quartan*, the same observation is to be made with regard to *Leaving the patient free from any habitual dis-*

ease, as has already been made in the Dissertation on regular tertain;---with this *exception*, that a regular Quotidian is *not so efficacious* in this respect as a regular tertian; and a regular Quartan is *still less efficacious*, (or rather it is apt to subject patients to diseases *arising out of itself*).

Although the greater number of intermitting fevers follow the tertian, quotidian, or quartan type; yet it sometimes happens, that intermittents return at the end of ninety six hours, so that they may be called *Quintans*; and there are even some which may be called *Sextants*; and the author has seen two or three cases of *Septants*.---*All the types beyond quartans*, that have come under his observation have *not continued such* for more than five or six paroxysms;---after which they have gone off;---or returned to quotidians, tertians, or quartans.

It has often happened, that intermittents, instead of Recurring at the end of forty eight, twenty four, or seventy two hours, (or two hours sooner or later than these periods;) have recurred at different times: as for instance, at the end of *thirty six* hours, (or two hours sooner or later.)---Of such fevers it must be observed, that *they* also have a disposition to vary from thirty four to thirty eight hours, or whatever be their period; (in the same manner as tertians, quotidians and quartans).---It is also to be observed, that they have a *great indisposition to return between eight in the evening and six in the morning*; which indisposition renders them *extremely irregular*; (for if a paroxysm should take place at noon on Sunday, the next paroxysm ought to take place at midnight between Monday and Tuesday; but instead of that, it often returns either at eight on Monday evening, or at six on Tuesday morning; or somewhat earlier on Monday evening or later on Tuesday morning).---*Such* fevers are also *in general very irregular*, whether they observe that or any other type different from the tertian, quotidian, or quartan.---Intermittents, which recur at the end of thirty six or any other number of hours different from the hours at which quotidians, tertians, and quartans recur; (if even each paroxysm continue only for eight, ten, or twelve hours); go nearly through the same progress as regular tertains, quotidians, or quartans: *yet they are not so apt to arise gradually to a certain height*, or to have so *perfect crises*, or to go *off by paroxysms regularly diminishing;* as either of those are which observe the regular types.---It is also true that it happens not uncommonly, that an intermittent, which has returned at the beginning at thirty six, or any other number of hours, not coincident with the tertian, quotidian, or quartan type; *very frequently in its progress becomes* tertian, quotidian, or quartan.

Whether a fever be a *regular tertian, quotidian, or quartan,* or follow any *other* type; *(provided* the paroxysms continue for eight, ten, or twelve hours, and the crises are tolerably complete;) every observation may be applied to it which has been made with regard to a regular tertian, (both as to their progress and manner of treatment).---It is also to be observed, that a *regular Tertian* goes through its course with greater regularity than an intermittent of any other type; and with less danger to the patient: and it is also more readily carried off by remedies.---*Quotidians are the next* in these points to tertians.---A regular *Quartan* is apt to be attended with many more accidents; but not so apt to be irregular, as fevers observing any other type, (excepting a quotidian or tertian).

Whether therefore an intermitting fever be of a tertian, quotidian, quartan, or any other type;---if that type should arise at the beginning; or if the disease should resemble a regular continued fever for the first ten days, and afterwards break down into an intermittent: also, if the paroxysms go each through their course in about twelve hours, and terminate in a tolerably perfect crisis, and continue the same type; or if at the beginning, or after they became intermittents, they change their type to a longer one:---in *any of these cases,* if they become more perfect in their intermissions for the first week or two, and afterward remain for several weeks nearly equal, and then gradually diminish; if the accessions also become less severe and the intermissions more perfect, until the disease gradually goes off; or if a severer paroxysm should take place and terminate in a more perfect crisis, and the disease not return afterward:---If an intermitting fever of any type should *thus go through its course; Every Observation* that has been made (and every *mode of Treatment* that has been laid down) in the Dissertation on *Regular Tertian;* will become applicable.

The only attention that is further to be paid, is in those cases, where through Irregularity or Accident, intermittents *Leave the course of a regular tertian*;---and become more dangerous in consequence.

The author means now, therefore, to *enumerate these Irregularities and Accidents* [in the case of Tertians.]

1*st*. The *first variation* from a regular tertian, he means to take notice of, is *a Prolongation of the paroxysms*; (so that instead of continuing for eight, ten, or twelve hours, each continues for a much greater length of time before the crisis is completed).

The *first cause of prolongation* of the paroxysms is a *Disease* which is apt to be excited in fever; and which the author intends to call *General Inflammation*.

This *Disease* arises sometimes in consequence of fever; frequently from many other causes: and it has often been *called* fever itself; sometimes inflammatory fever; and sometimes inflammatory diathesis.---It differs, however, from fever wholly; (as it may arise, continue its course, and terminate, without any fever being present; and a fever may arise, pursue its own course, and terminate, without general inflammation at all taking place.)

(A.) The most simple appearance in general inflammation (and which seems to constitute the disease) is *Hardness* of the pulse.---Hardness of the pulse is an *action in the arteries in contracting*, which gives a peculiar feel to the finger pressed moderately upon the skin where it lies over any large artery; (such as, for example, the radial artery in the wrist).

The sensitive powers of different persons are by no means the same.—The author wishes to avoid all metaphysical questions: and therefore leaves it to those who choose to amuse themselves with such subjects, whether it be by some formation of the organs of the senses congenital with man, or whether it be acquired by education; that there are certain discriminations of ideas which the organs of the senses of one person *may* receive, and which the same organs in another person *cannot* receive.---For instance, one person may be perfectly sensible by his ear of the concord or discord of the number of vibrations of any musical instrument, so as to experience pleasure or pain ; while the ear of another person may be in no wise capable of making such distinction ; (and he may be capable of receiving no pleasure from concordant vibrations, or no pain from the discordant).---In like manner, the sensations from feeling are much more acute in some persons than in others. We are told from authority that can hardly be doubted, that some blind men have been able to distinguish colors by feel : or at least have been able to distinguish the shape of the colored from the uncolored parts of cards ; so as to play at the games of which these cards are the instruments. ---The author wishes to show that a man, whose ears are not attuned to musical notes, is not warranted to say that no other man's ears are attuned to musical notes, so as to be able to distinguish between concord and discord : and it is true in a much stronger degree, that a man shall not say, that because he cannot distinguish between objects of different colors, or between the shades of a colored part of a card and the white part of it, by feeling ; that no other man is capable of making that distinction.---Now let us apply these facts to the case before us. If a man should say, that he could find no such distinct feelings in the pulsation of an artery : will it prove, that another man cannot find such distinction ? (Dr. William Hunter for example, however great as an anatomist, constantly denied that he could feel any such distinction as hardness of the pulse ; neither could his ears distinguish concord from discord ; while his brother, Mr. John Hunter, as he has affirmed in his works, could well distinguish hardness of the pulse ; and as the author knows, could also distinguish concord from discord in a musical instrument.)---The author thinks that he has established, that a man's denying that his organs of sensation can discriminate between two sensations ; is not a proof that such distinction cannot be felt by others. He could readily cite also a great many authorities, on which he might rest himself ; that there *is such a sensation as hardness of the pulse*, to be felt by laying the finger upon the skin over a considerable artery.

But he thinks it better to refer the proof of this argument to the *following fact*, which may perhaps be thought of much more weight. If a vein be opened, after a ligature or any other pressure has been made upon it ; and if blood should flow from the opening into a basin, the shape of which somewhat approaches to the section of a sphere; it sometimes happens, that the blood *coagulates* in the basin in less than a minute; and sometimes it is four or five minutes before it coagulates:---this difference depending in some measure on the circumstances in which the opening is made and the blood flows. ---If the vein which is opened be large, and the orifice be also large; if the blood flow in a stream through the air from the orifice into the basin; if the basin be a perfect section of a sphere; if the quantity of blood taken away be large, and flows quickly: it will be more apt to continue fluid for a greater length of time.---If the vein from which the blood is taken be small, and only a small orifice be made in it; if the blood, instead of flowing in a stream through the air, should run down upon the skin of the arm into the basin; or if instead of flowing immediately through the air in a stream, the stream be intercepted by any surface, and from that surface, should fall into the basin; or if the basin, instead of being a section of a sphere, should be of some other figure the surface of which is larger in proportion to its contents: in all these circumstances the blood will coagulate *sooner*.---When the blood coagulates *soon*, there is not time for the red particles to subside from the top of it; and the whole coagulates into a red mass.---When the blood is received into a vessel and coagulates *slowly*; the red particles (being of greater specific gravity than the other parts of the blood) have time to subside; so that the blood separates into two parts before the coagulation takes place; (the upper part forming a fluid nearly colorless and transparent, and the lower part forming a red opaque fluid;) and when the coagulation takes place, the upper part is of a bluish or yellowish color, and the under part red.

Both when the blood coagulates soon, (and does not give time to the red globules to sink from the upper part of the blood); and when the blood is long-coagulating, (so as to give time for the red particles to sink from the top of the blood): after the whole is *once coagulated*, it appears at *first* a perfect solid:---Only when it coagulates soon, the whole appears a *red* solid: but when it coagulates slowly, it has the appearance of a solid whose surface is colorless, (or rather with a *yellowish or brownish tint* to the depth of a quarter of an inch, or a little more;) and below that, it is of a red color.---In *both* cases, a fluid generally oozes out from the surface of the solid mass; in which fluid the solid mass swims.---(When the blood is coagulated *quickly*, the whole of the solid mass is red: and when the blood is coagulated *slowly*, the greatest part of the solid mass is red, but covered at the top with a *crust* nearly colorless, but somewhat tinged with yellow or brown, which crust has often been called the *Buff* of the blood.)

It has been already said, that the size of the vein, the size of the orifice made in it, the *flowing of the blood in a full stream* through the *air*, and the *shape of the basin* into which the blood is received; have a considerable influence on the blood's coagulating sooner or later;---and in consequence, on a crust's being formed on the surface of the blood free from red particles after it has coagulated.---But it is also to be observed, that *independent of all these circumstances;* (or in other words, supposing that blood be taken from two persons, when all the above circumstances have been exactly the same;) yet the blood shall be longer coagulating (and in consequence shall show what has been called a buff,) when taken from *One person;* and coagulate soon and consequently show no buff, when taken from *Another person.*---In this case (excepting in a few instances,) when the blood coagulates slowly, the pulse has a feel of *Hardness;* and there is a buff on the surface of the blood: whereas, when the pulse has no such feel of hardness, the blood coagulates quickly, and there is no appearance of a buff on the surface of the coagulum.

Here then is *another criterion* (beside the power in the practitioner of *distinguishing sensations*) by which the actions of the arteries may be discriminated:---to wit: that *they sometimes act so as to make the blood coagulate slowly,* when it flows from a vein into a basin, in some cases; and in other cases to coagulate *quickly;* (though taken in the same circumstances).---The author farther affirms, that when the pulse *has a feel of hardness,* the blood taken from a vein is *longer* coagulating, than when *no* hardness is to be felt; and that therefore there is actually a sensation of hardness to be felt in the pulse, in contradistinction to all other sensations. (In other words; the action of the arteries which gives this sensation, also produces a disposition to make the blood remain longer fluid after flowing from a vein into a basin; other circumstances being the same).

It is to be observed, that *every thing on this earth follows by gradations.* (The twilight, which begins in the morning, gradually acquires meridian splendor, and gradually sinks from its meridian splendor into the shades of night. There is a gradation of animals from human beings, until they descend through quadrupeds, fishes, and reptiles; and come down at last to corals, spunges, and mushrooms; until it is difficult to say which is animal or which vegetable.) *Such gradations are there in the feel of the pulsations of the arteries.*---In *some* cases the sensation of hardness in the pulsations of the arteries can scarcely miss being sensible to any person, who has the least delicacy of feeling; (as happens in *violent pleurisy and acute rheumatism*). In such diseases, it is difficult to produce a quick coagulation of the blood, or to prevent an appearance of buff on the surface of the coagulation.---(To prevent it, it is not only necessary to make a small orifice in a small vein, and let the blood run down the arm into a shallow vessel; but it is even necessary to interpose some other substance, over the surface of which it shall run before it falls into the basin, to make it coagulate quickly; and thence show no buff on the surface of the coagulum. In other cases the sensation of hardness is hardly discernible; and the least variation of the circumstances, with which the blood is taken, will *prevent* the appearance of a buff.)

There is *another sensation* which the pulsation of the arteries gives, which the author calls *Obstruction*.---This obstruction of the pulse has been generally felt in fevers, and has been *called hardness* by many authors.---That it is a *different affection of the arteries* which gives this sensation to the pulse is very evident: since the feel of obstruction may be very great; and nevertheless blood flowing from a vein into a basin, under all the circumstances most favorable to its remaining fluid, coagulates immediately in these cases; no buff appearing on the surface of the coagulum.---It happens often for example, at the beginning of the hot fit of an intermitting fever, that the pulse is very much obstructed, and has by many authors been said to be hard: yet frequently (indeed always,) when it is only obstructed, and not hard, if blood be taken from the arm and received into a basin, under all the circumstances that tend to make it remain fluid; it nevertheless coagulates immediately; so that no buff appears on the surface of the coagulum.---*Fulness* and *Strength* of the pulse have also often been confounded with hardness; but neither fulness nor strength is at all necessary to the feel of hardness. (In an inflammation of the intestines, the pulse is always hard; and blood taken from a vein into a basin remains long fluid, the coagulum being covered with a buff: but the pulse in this case, though hard, is neither full nor strong.)---*Hardness*, therefore, is a peculiar sensation given by the pulsation of the arteries; differing from strength, and fulness, and obstruction; as well as from every other sensation, which the pulsation of the arteries produces in a finger applied to the skin immediately over an artery.

(B.) The sensation of hardness in the pulse is evidently a mark of strong action of the arteries.---The *coagulable lymph*, in the *living* animal, remains fluid; and the mucilaginous part of it continues dissolved in its water: while in the blood-vessels of *dead* animals, the mucilaginous part separates with the water with which it is combined.---It is therefore the *Life* of the blood-vessels, which keeps the mucilaginous part dissolved in the water; and *consequently* keeps the coagulable lymph fluid.

It has been *said by some*, that the *mucilage* of the coagulable lymph in living animals remains soluble in water, because the blood in a living animal is *constantly in motion;* (and that it is the motion which occasions its solubility in water, and consequent fluidity.)---But that this is not the case, is evident.---In the *first* place (without adverting to the chemical maxim, that motion or rest can have no effect on the powers of chemical combination,) this must be observed. In a *fainting fit*, (which is sometimes continued for many hours without any motion's being perceived in the heart or pulsation in the arteries, and consequently without any motion of the blood,) the blood has remained fluid; and consequently the mucilage of the coagulable lymph has remained soluble in water. In a *dead* body however, (in a much less number of hours,) it separates from its water and becomes solid; so as to render any further circulation of the blood impracticable.---There is a *second* objection to this opinion. The *mucilage* of the coagulable lymph, after it has been *once separated* from its water by coagulation, in no instance becomes soluble in water again; excepting by putrefaction, or by boiling in water, or by maceration in water heated to nearly two hundred and twelve degrees (or at least to more than one hundred and forty degrees; a heat much superior to any that ever takes place in the living human body.)---It is not therefore *motion*, that gives to the mucilage of the coagulable lymph a disposition to remain soluble in water, and therefore fluid; but a *stronger action of the Living Power* exerted in the arteries.---But the fluids of the human body (as well as the solids) have *chemical* properties, in consequence of their being *alive;* which they have not when they are dead: and hence, when the blood remains fluid for a long time after it flows from a vein into a basin, (so as to allow the red globules to fall from the top before it is coagulated, and so as to give the appearance of buff to the surface of the coagulum;) we must conceive, that the *Life* remains in it for some time after it is taken out of the body.

Whatever may be the case; whether it be that this continuance of fluidity of the blood for a longer space of time, is owing to the *superior action of the arteries* on the blood, or that the *life remains longer in the blood itself* after it is taken from the body; its remaining long fluid (and in consequence a buff appearing on the surface of the coagulum,) shows that there is a superior action of the *living* power in the body, when there is hardness of the pulse.---This hardness is pointed out by the feel of the pulsation of the arteries; and by the blood when once taken (in the circumstances already enumerated) from a vein into a basin, showing an appearance of buff on the surface of the coagulum.

(C.) *Hardness*of the pulse *considered by itself* shows, that the Living Power is acting too strongly in the blood-vessels for a man to be considered in perfect health. (Sometimes however it is accompanied with no other appearance of strong action of the living power in the blood-vessels: nor does it disorder a man not afflicted with disease, so as to prevent him from going through the ordinary functions of life:)---But if it should take place *in any disease,* it very often *alters the progress* of that disease.

If it should happen in a regular tertian, it *prolongs the time of each paroxysm of the tertian;* so that (instead of the paroxysm going through its ordinary course of eight, ten, or twelve hours,) it may require twelve, fourteen, sixteen, or many more hours, for it to go through that course.

(D.) An action in the arteries producing a feel of hardness in the pulse, constitutes what has been called above, *General Inflammation;* and forms the *simplest case of the disease in question;*---but *other* symptoms frequently attend it. The heart often acts more strongly; (that is, the left ventricle contracts with greater force, so as to propel the blood with greater force into the arteries).---In this case, if the finger be pressed upon a large artery lying immediately under the skin, this artery during the time of its distention resists pressure; which sensation has been generally called *strength of the pulse*.---By this stronger action of the heart and arteries, the velocity of the blood is also increased; by which means it is made to return faster upon the heart, and to stimulate the heart to more *frequent* contractions; (so that the pulsations of the arteries are not only hard and strong, but also frequent.)---It happens too, if there be no other disease but general inflammation; that the left ventricle makes a full and complete contraction: and when any muscle makes a full and complete contraction, it is fully and completely relaxed after such contraction. The ventricle of the heart then, after making a complete contraction, makes a complete relaxation; and receives into it a large quantity of blood from the auricle, and propels all that blood at each contraction into the arteries: So that the artery in which the pulse is felt is greatly distended: and the pulse becomes not only hard, strong, and frequent; but also *full*.---If the pulse should *merely become hard*, we cannot say that a man is in perfect health; but if it also become *full, strong and frequent*, it certainly *constitutes a disease of itself*:---that is to say, it prevents the functions of the body from being carried on perfectly and regularly; (and may even produce such derangements in the system as to destroy the patient.)---This is the *Disease* which the author calls *General Inflammation*.

(E.) The *slightest case of general inflammation* then is hardness of the pulse, in any degree; (for in perfect health there is no such sensation in the pulsation).---When the disease is in somewhat a *greater degree*, the pulse is not only hard; but there is a sense of fulness and uneasiness all over the body; a want of appetite; and restless sleep.---If the disease should be in *a still greater degree*; the pulse becomes full, strong, and frequent; from about a hundred to a hundred and ten pulsations in a minute.---It is also *uniform* (that is to say, the pulsations are equal in time, frequency, and force;) *provided* the disease does not arise in consequence of any *other* disease existing in the system.---*With these appearances* there are want of sleep, total loss of appetite, sense of universal distention, flying pains in the extremities, general tumor and redness, the patient draws his breath deep, there is sometimes cough, pain in the internal part of the head (the patient complaining that his head is ready to burst), fulness of the vessels of the eyes, and delirium.

When this disease proves fatal, the feel of tension throughout the system suddenly going off, the patient sinks; or the affection of the brain may be so great, as to destroy the patient.

It is *not* the author's business in this Dissertation to show the general *cause, progress, and termination of this disease* [here termed *General Inflammation.*]---It is sufficient at present to remark, that it is *not uncommonly excited in a regular tertian, and other intermittent fevers*;---and next, to point out the *effects* which it produces in intermitting fevers, and the *Means of counteracting them.*

General inflammation is excited in intermitting fevers most commonly, when they happen in *temperate and cold* climates; and *in particular states of the fever itself*;---(especially when the fulness, arising from the small vessels contracting and filling the large vessels with blood, distends them and stimulates them; or perhaps from some other cause).

When *General Inflammation arises in a Regular Tertian:* the pulse in the hot fit, is not only full, strong, frequent, and obstructed; but likewise hard: so that if blood be taken from the arm, the red particles fall from the surface before it coagulates; (and after this spontaneous separation, the coagulum is covered with a buff-colored crust). There is fulness also of the vessels of the head, (shown by the vessels of the eye appearing more numerous, and the external jugulars appearing fuller). The pain of the head becomes greater, and is felt more internally; and there is sometimes delirium even in the first paroxysm of the disease.---more particularly the *hot fit is protracted.* The paroxysm often continues in this case, in a regular tertian, for thirty six or forty hours, before any critical symptoms take place. Nor is the crisis then perfect; the pulse still remaining frequent, the appetite not returning, the tongue being still covered with a crust, and the head-ach remaining; (though in other respects the patient *is relieved*, and falls into a quiet sleep for a few hours.) Sometimes again the relief is but trifling; and a practitioner would be *led to suppose it a continued fever;* excepting that the paroxysms, attack the patient in the day time, not in the evening;

that the exacerbations are greater than in continued fever; and that they observe very exactly the tertian type.

This is one of the cases of fever that was called by the Greeks *Hemitriteon*;---and by Celsus *Semitertian*;---(though certainly not the most frequent case to which they gave that name.)

If general inflammation should take place in a great degree in a *Quotidian;* there is for the *first week* (or a day or two longer), all the appearance of a continued fever; except that the exacerbations take place in the day time (and not in the evening.)

If it should be one of those *Anomalous Cases*, which fall *between* a *quotidian and a tertian;* then if the returns of the paroxysms should be near the quotidian type, (that is to say, in less than thirty six hours;) the disease has *at first* the appearance of a continued fever; excepting for the times of the recurring of the exacerbations.---If it should be *nearer a tertian*, it is still nearer to what happens in a tertian; (that is to say, there is some appearance of crisis taking place before the next exacerbation comes on).

If general inflammation should take place in a great degree in a tertian, which afterwards becomes a *Quartan;* most commonly (*during the time the general inflammation continues*) it keeps it in the tertian type:---But if it should not retain the tertian type, the paroxysm is prolonged from thirty to fifty hours; and the crisis is very incomplete; (the pulse especially continuing hard, and often full and strong, during the time of the intermission).

When in any case, in an intermittent fever, general inflammation has prevented the crisis from leaving the patient so free from the disease; as to take off the hardness, fullness, and frequency of the pulse, the foulness of the tongue, and internal head-ach: the disease has been looked upon by many practitioners as a *Continued fever*.—That it is not, is known, first by the exacerbation taking place between six in the morning and five in the afternoon; and secondly, by the fever breaking down into a complete intermittent, after the general inflammation is gone off.

The exertions which take place from the fever itself, and the increased action of the heart and arteries which constitute general inflammation, gradually weaken the system; and by this means *carry off the general inflammation*:---and afterward the intermittent becomes regular.---This happens commonly before the end of the second week of the disease; and the fever (after the general inflammation is gone off) goes on much the same *as if no general inflammation had arisen;* with this difference, that it is *more irregular.*

In *temperate and cold climates*, general inflammation happening at the beginning of an intermittent, is not often fatal; (even during the time that it renders the intermittent similar to a continued fever.) —If general inflammation *should not prevent the crisis* from taking place, it is hardly ever fatal either in itself or in its consequences. —If general inflammation should take place in an intermittent, in *temperate or cold* climates, *no mischief will arise from employing remedies* to carry it off.

In *hot* climates, general inflammation more seldom happens; but when it does take place, it renders it doubtful whether *Remedies* can be employed to carry it off, until it is too late for their being of any use.

The most powerful *Remedy* for carrying off general inflammation is evacuating the blood-vessels.

The blood-vessels must always contract themselves so as to adapt themselves to the quantity of blood which is contained in them; and must always be cylindrical, when not compressed by an external force.—This contraction is an exertion of the *Living Power.*—It was long thought to depend upon the *elasticity* of the vessels. But elasticity is a power which *dead* matter has; which occasions a cylinder to contract, if it be distended beyond its disposition to contraction; and at the same time occasions it to become larger, if the cylinder has had its diameter lessened by any other force; (as has been explained in a former Dissertation).—That the contraction of the vessels (so as to adapt themselves to the blood which is in them) depends on a power which arises from the *Life;* is evident from the Experiment and Observations *which follow.*

If an animal be killed by any means which do not empty the blood-vessels, (such as breathing a quantity of air unfit for respiration;) as soon as the body is dead, and though there is no exudation from the blood-vessels into the other cavities; the blood-vessels *enlarge,* and in consequence become in *part* empty. (The *arteries* become so empty, that it was supposed by the ancients, that they contained only air when the animal was alive: and the *veins* are no longer cylindrical, but flat). The paleness of all the parts (in proportion to their floridness when the animal was alive) shows, that the *capillary vessels* contain also a less quantity of blood, in proportion to the diameter which they now assume.—From these appearances it is evident, that the blood-vessels have lost that power, which contracts them to the size they possess in a living animal; and that, being left to their elasticity, this *elasticity has distended them.* Therefore their elasticity is so far from being the power, that contracts the blood-vessels, to adapt them to the blood that is in them, in the living animal; that it is constantly endeavoring to counteract that power, and to distend them.

This *action* (which contracts the blood-vessels so as to adapt them to the existing quantity of blood) is the *first and most necessary exertion of the Living Power;* because if the blood-vessels be in any way emptied, so that there is not a sufficient quantity of power in the body to contract them to suit the remaining blood; every other operation (whatever it may be) ceases.—But *all the exertions of the Body and Mind,* as has already been shown, are also diminished, if a portion of the blood be taken away; even though the blood-vessels contract, and continue cylindrical and full. Thus if a man is accustomed to labor, (that is, to employ his muscles in pulling along any weight;) he can only pull a certain weight forward in a given time, according to his strength: for example, he can pull forward a hundred weight with a velocity of a mile in an hour. If the blood-vessels of this man be so emptied as to contain a pound less of blood; the blood-vessels will contract so as to adapt themselves to the remaining blood: but the man will not be able to pull forward a hundred weight with the velocity of a mile in an hour; but will be obliged (if he be to pull a weight forward at a mile in an hour) to retrench it to half a hundred weight; or if he must pull the whole hundred weight forward, he cannot do it with a velocity greater than half a mile in an hour.—Again, this argument may be taken in another light. Suppose a man in full vigor is capable of pulling along a hundred weight with a velocity of a mile in an hour, and can maintain this labor for six hours together; (after which his strength is exhausted, and he is obliged to rest, that it may be recruited before he can begin his labor again:) If in this man a pound of blood be taken away, the blood-vessels will contract themselves and continue cylindrical, and perfectly full of blood; but the man [illegible] —diminishing the quan- [illegible] small vessels. [illegible] of blood. [illegible] considerable [illegible] effect [illegible] weaken- [illegible] the same [illegible] been taken [illegible] large quantity [illegible] the body, [illegible] several [illegible] which is [illegible] animal, [illegible] large quanti- [illegible] greater [illegible] the blood [illegible] smaller quan- [illegible] until the [illegible] more [illegible] allowed to [illegible] continue much weaker than before the evacuation.—If the same quantity of blood be taken away slowly, or at different times; no temporary weakness shall arise, beyond what continues after the evacuation.—In intermitting fever, it is the *present* strong action of the arteries we wish to carry off: we by no means wish to produce *permanent* weakness; (since this would render the fever afterward irregular.)

The practitioner is therefore to weigh the degree of general inflammation, the strength of the patient, and the mischief arising from general inflammation in the disease; and thence determine the *quantity of blood* to be taken away.---The author has often found *sixteen ounces of blood, taken away at once,* of more use than twenty four ounces taken at twice.

General inflammation, or increased action of the heart and arteries, (shown by the pulse becoming hard, full, and strong; the tongue being covered with a thick white fur; there being considerable sense of tension all over the body;) may *prolong*, as has been said, the hot fit of fever: so that instead of eight, ten, or twelve hours, it may continue for thirty-six hours, or even still longer; and render the intermissions short and incomplete: or it may make the disease have nearly the appearance of a continued fever, and may produce stupor and delirium, (and run a risk of destroying the patient.)—In *such cases* it is proper to carry off the general inflammation by making evacuations by bleeding; (in order to avoid the danger, or to shorten the paroxysm.) If it do not endanger the life of the patient, or prolong the paroxysm; it will soon wear itself out: (as the patient's strength is diminished by the efforts, which are made during the time of the paroxysm.)—As the whole of the patient's strength is wanted, to support him during the course of the disease; it is to be observed, that when the intermissions become tolerably perfect, some *Food* may be given during the time of them; so as to replenish the vessels with blood, and recruit the strength that is lost by emptying them:—and that it is therefore *better to err in taking away too large,* than too small a quantity of blood.

In intermittents happening in *temperate and cold* climates, the intermissions become almost always tolerably perfect. In such cases, therefore, we need not hesitate in taking away blood; if any danger or prolongation of the paroxysm should arise from general inflammation.—In hot climates, (where sometimes there are hardly ever perfect intermissions; and where the patient is much sooner exhausted by the exertions, which take place in the paroxysms; and where the intermissions and remissions are seldom sufficiently perfect, to allow the patient to be recruited by employing food which gives much nourishment;) there should be *great caution before blood is taken* away, excepting there be real danger from the general inflammation. —Such danger of general inflammation may arise from the tension, and from the head's being affected:— (And if there should be such real danger, a sufficient quantity should be taken away at once; that the evacuation may not require to be repeated.)

If *general inflammation* should arise at the *beginning of a continued fever*, the dangers from it and the manner of managing the patient, will be shown in another Dissertation; (in which the irregularities in such fevers, and the methods of obviating them, will be noticed.)

Although *general inflammation* at the beginning of an intermittent, may be *one cause* of endangering the life of a patient; or of making the disease have the appearance of a continued fever, (only that the paroxysms do not take place in the evening;) or of prolonging the paroxysm to thirty-six hours, and rendering the intermissions imperfect: *Yet* it is by no means the *only cause*.—Sometimes when the pulse is full, strong, and obstructed, (but by no means hard, the blood also taken from the arm not showing any inflammatory crust;) yet the paroxysm, for no reason which has been investigated, runs on (for the length of thirty-six hours in a tertian; for eighteen or twenty hours in a quotidian; and sometimes, though rarely, to sixty hours in a quartan.)—In these cases, the patient falls into a profuse sweat, and a lateritious sediment falls to the bottom of the urine: he feels himself much exhausted, and perhaps falls into a sleep for two or three hours; (the sleep having been prevented during the paroxysm;) and the disease by no means goes off completely before the return of the paroxysm.---In this case a few paroxysms weaken the patient very much, and *sometimes prove fatal*.---This variety has *also* been called *Hemitriteon*, or *Semitertian*.*---It differs entirely from those intermittents, which have their paroxysms *prolonged* by general inflammation.

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* See p. 380.

When this case of *Semitertian* arises in *temperate or cold* countries, generally (if the disease be left to itself) the paroxysms shorten the crisis, and intermissions become more perfect; and the disease is changed into a regular quotidian, tertian, or quartan.---The *remedies to be employed, to hasten its conversion* into a regular tertian, are, in the first place, clearing the intestines from noxious matter contained in them, by an *Emetic:* which it is best to employ in the evening, (in the same manner as has been directed in a regular fever.) On the next day, in the morning, a moderate dose of rhubarb, (or some other *purgative*, which tends to increase the peristaltic motion of the intestines,) should be exhibited.---After the intestines have been cleared of their contents, preparations of *antimony or ipecacuanha,* (or such other medicines as tend to produce appearances similar to those which take place in the crisis of fever) should be exhibited at the interval of four, five, or six hours; so as to act constantly on the system. These should be continued for several days ;---until a perfect and longer intermission has taken place. When a perfect intermission has been procured, (if it should continue but for six or eight hours,) the *bark* of the cinchona should be given in a powder to the quantity of a dram or two drams every hour or even every half hour; or as much in quantity and as frequently, as the stomach will bear.---The bark is to be omitted when the next paroxysm, (if it should return,) has come on; and be repeated again in the next intermission; provided it is as perfect as the former one. If it be not, the medicines producing appearances similar to those which take place in the crisis of fevers, are to be employed; until another intermission has been produced; in which case the cinchona is to be again exhibited.---If the exhibition of the cinchona should have prevented the return of the paroxysm altogether, the practice should be followed that has been pointed out in a regular tertian.—*Supposing* that the exhibition of such medicines as produce appearances similar to those, that arise in the ordinary crisis of fevers, should not produce a perfect crisis, nor shorten the paroxysms; and that the patient is so much weakened, that his life is endangered from the weakness taking place in the disease: the *cinchona* is to be employed in the *best remission* that can be procured; and its exhibition regulated as has been already described in the management of a regular tertian.

Tertians, quotidians, or quartans, which have their paroxysms prolonged in temperate or cold climates, are still not very formidable: either falling of themselves or by means of medicines, into fevers, the paroxysms of which are shorter or the crisis of them more perfect: (as has been above described.)

3d. When *general inflammation* takes place at the beginning of an intermittent, although it has not been accounted for *why* the general inflammation should prolong the hot fit; yet it is evident, that it is often the *cause* of its prolongation.—When there is no great hardness of the pulse; and often when there is no great fulness and strength of it, *but only frequency and obstruction;* the hot fit is frequently prolonged; (even so as to leave no other mark of an intermittent to distinguish it from a continued fever, excepting the exacerbations not taking place in the evening).

When this happens in *hot* climates, the disease is the most formidable which is incident to mankind.

It has frequently been called the *Plague;* and by several other names, indicating the most fatal disease.

In countries where the heat of the atmosphere rises above 90° of Fahrenheit's thermometer; where the ground is marshy, or where there are stagnating waters, or where thick forests prevent the heat of the sun from drying the earth;—*three diseases*, the most fatal to the human race (to wit, *dysentery* alone, *continued or remitting fever producing it*, and *irregular semitertians,*) frequently arise.

4th. Of these diseases the author at present means to treat only of *Irregular Semitertians.*

(A.) Irregular semitertians (as well as these other diseases) arise, as has been said, from water stagnating in marshes; or from the air's being kept moist in countries covered with wood, and where great quantities of rain fall.—In all these cases *in hot countries*, if there should be any animal or vegetable matter at hand liable to putrefaction, (one hundred degrees of Fahrenheit's thermometer being the most proper heat for putrefaction) the animal and vegetable substances fall readily into the *putrefactive* fermentation.—The vapor arising from putrefying animal and vegetable substances, has already been shown (in a former Dissertation) to be one of the most powerful causes of fever: and several practitioners have thought this vapor always to be the cause of the semitertians, which are treated of at present.---The author has shown in a former Dissertation, that *moisture* (when dissolved in the atmosphere or when evaporating,) generates *cold*. That cold so generated is also one powerful cause of fever; and that it is often the cause of intermittents (as well as of the other diseases which have been above enumerated,) without any putrefaction taking place; is certain from several proofs.--- These diseases have been produced in countries where the water was found at a foot or two under the surface of the earth; moisture arising thence and contaminating the air, so as to occasion these diseases; though the soil has been perfectly dry, and there has not been the least appearance of putrefaction, (the country being clear from woods). In this case it could be nothing but the *moisture* that produced the disease. (One instance of this occurred in the encampment of the English army, in a war about the year 1745; in a sandy plain in Flanders. Another in a region of Peru; where water is every where to be found at about seventeen inches below the surface of the earth; though the country itself is barren for want of water, but is uninhabitable from the number of dysenteries and semitertians which take place in it. The author could mention many instances of the like kind: But these are sufficient to show that *moisture without putrefaction* often produces this disease.)

(B.) The next thing that draws our attention is, whether *Infection* be not also one cause of these semitertians. The author has already said that *fevers are infectious;---regular tertians being the least* infectious; and a *regular continued fever* (when its symptoms are in an intense degree,) the *most* infectious.

The *Opinion* about the *infectiousness of the semitertians of hot climates* (where they are so very fatal) *has been various;* and has been given by young and unlearned practitioners with such positive and contradictory firmness; that it is very difficult here to form any true conclusion.---It has happened that a town or even several towns have grown up near harbors suddenly, in countries before uncultivated; and the inhabitants, paying attention to trade only, have neglected the means of carrying off putrescent matter. When the heat has in this case arisen to any very considerable degree; putrefaction has taken place; and has occasioned such semitertians, (as at Philadelphia.)---A semitertian arising in a town under these circumstances, the inhabitants have been alarmed, and anxious to investigate the cause: and one origin has then suggested itself to them: viz. that infection has been *imported by ships* arriving from countries in which infectious fevers have subsisted: but this suspicion has almost always occurred without any minute attention to the rise of the disease.---When this happens in a town where the heat, under certain circumstances, is very intense; (as where winds blow in the beginning of the summer over a sea or over a continent, lying near the equator; and which at other times is subject to extreme cold, from winds blowing over a continent further from the equator:) In such towns (when the summer is a little advanced and the heat becomes constant) great putrefaction takes place. In consequence, fevers have arisen very suddenly, and universally.---At this time many ships, from local circumstances, have arrived from countries where infectious fevers are very common: and the sudden breaking out of this very fatal fever has been ascribed to the arrival of such ships:---though ships of this description have arrived at other times of the year (when no such heat or putrefaction was prevalent,) without any infection having taken place.---This renders it extremely doubtful, whether the fevers arise from *imported* infection.

Many inhabitants of such towns as have been described, upon the breaking out of such a fever, have fled into the country.---In this case, *two things* might happen to prevent the disease arising among those, who had gone into the country: the one, their not being exposed to the infection, supposing the infection existing; the other, the removal from masses of putrescent matter.---It is to be inquired therefore, *to which of these two causes* the exemption from such fevers, in those who removed into the country was owing.---The author himself never having been in a situation to observe the circumstances, which could determine his opinion; must depend upon facts related to him by those who have been present under these circumstances, and whom at the same time he has had an opportunity of cross examining: (for no good evidence can be procured from the writers, who have lately treated on this subject in such situations; from the great attachment to hypothesis, which is so manifest among them.)---From the evidence the author has been able to collect, it would seem, that these semitertians are not very infectious; since in hospitals, (where patients were received in such fevers) the physicians, surgeons, and other attendants, were not oftener seized with the fever; than the other inhabitants of these towns. Moreover, though many ships have arrived from these towns in the several ports of Europe, (and in many certainly without performing any quarantine;) yet the disease has never been produced in Europe. On the other hand, in the war between Great Britain, France and Spain, (where the American independence was the ground of the pursuit,) when [a truly] infectious fever broke out in the combined fleets of France, and Spain, which obliged them to put into the harbor of Brest: in this case in the hospitals of Brest, every one of the nurses, and above one hundred and fifty of the practitioners in medicine, caught the disease; and were cut off by it.

The author therefore thinks he may believe, that though (as he has before asserted) all fevers are infectious; yet these *semitertians* are (like the other varieties of intermitting fevers) *not very infectious.*

It may be concluded therefore; that these fevers arise sometimes from *putrefaction*;---sometimes from *cold, generated* by small drops of water evaporating or dissolving in some or all the vapors which constitute the atmosphere;---and sometimes from *infection.*

(C.) The author now means to attempt a *Description of this disease,* [the Semitertian.] It must however again be remarked, that he has never had an opportunity of observing this disease himself; never having been in a hot climate.---His knowledge of it in the *first* place is taken from descriptions of it in authors, which nevertheless are in many particulars very defective: In the *second* place, from descriptions of it which have been given him by many practitioners, who have treated the disease in warm climates; (and five of whom had been affected with it themselves:) And in the *third* place, from the descriptions of it by several patients who had been afflicted with the disease; and from whom (although they had not any knowledge of medicine) he has had an opportunity of inquiring what appearances they recollected during the time of the disease.

The author wishes first to describe the disease in its *most violent form;* (and when it approaches nearest to a continual fever.)

In the first place, the attack has been so violent, as to carry off the patient in the very first paroxysm: in which case the disease, properly speaking, must be called an *Ephemera.* (This was seen more particularly at Bencoolen, when Fort Marlborough was situated in a marsh, near the sea shore; though it has ceased to be so fatal, since the Fort has been removed to a more elevated ground.)

It happens in a less violent degree in *other* cases: Thus, when European troops have been sent to islands between the Tropics, lying on the eastern coast of America; the *first* onset of the fever [though severe,] has rarely been fatal.---The patient has been seized at once with all the most violent symptoms of the first stage of fever. Sometimes a sense of coldness; shivering; rigor and horror; great depression of strength; want of disposition to exert the powers of the mind; and a total apathy to all external objects; have occurred. There has been great thirst; the tongue sometimes has been covered with a thick fur; and nausea, a total aversion to food, a want of sleep, and all the other most violent symptoms of the attack of a regular fever; have taken place.---Moreover the disease in all those who had been affected with it whom afterward the author had occasion to see, (and who remembered the circumstance,) began between six in the morning, and eight at night: the attack having been well marked; and no symptoms of the first stage having preceded for several days.---After the first attack, the exacerbations became much more violent; so that the disease increased very fast.

The author however could never gain any information, whether these exacerbations took place in the *evening*, or at any *other* part of the day.---A knowledge of this fact would have furnished the great criterion between intermittent or remittent fever, (whose exacerbations take place between six in the morning and six o'clock in the evening;) and continued fevers, (in which the exacerbations always take place between five and six in the evening.)

On the second, third, fourth, or fifth day, the *nausea increases*; and the patient begins to bring up a dark *brown matter*; which has the appearance in some degree of the matter formed upon the tongue in very violent fevers. It is most probably formed upon the surface of the stomach, and perhaps of the duodenum, or even on the beginning of the jejunum; but it has neither the color nor taste of bile.---The force of the exertion in vomiting however often occasions a *greater quantity of bile* to be secreted and thrown back into the stomach; and to be brought up with the dark brown matter: and when this happens, it gives to the matter thrown up the taste and appearance of bile. (At other times it is repeated, there is no appearance of bile at all; but only of this dark brown matter.)---

When such vomiting has taken place to any great degree, the action of any medicine thrown into the stomach is apparently prevented; the food is not digested; and the patient is almost always cut off.---This has given the name of *Black Vomit* to the disease.

At other times, *Spasmodic contractions of the extremities* take place, (similar to the varieties of tetanus;) with violent delirium:---and these symptoms are often fatal, though not so constantly as the vomiting which has been just described.

At other times the skin assumes a dark brown color; which has given it the denomination of *Yellow Fever*.---Many have supposed, that this was owing to a quantity of bile getting into the blood-vessels; and have conceived that bile was the cause of the appearance. The color, however, is very different from that which takes place in jaundice. (The evacuations from the intestines have not that clay-like appearance, which [illegible] common in jaundice: and the secretion from the kidneys has not that deep yellowish brown nor that thick sediment which have almost always been seen in those persons, in whom bile has got into the blood-vessels.)---The dark brown color of the skin therefore seems to the author rather to arise from a greater secretion of the *sebaceous matter*, secreted by the sebaceous glands of the skin; than from any other cause.

This fever often likewise has *Dysentery* arising in it; but (as the author does not here mean to treat of that disease) he has only to observe, that this Dysentery, along with the fever, very soon weakens and wears out the patient; rendering the disease extremely fatal.

The fever, as the author has described it, *seems* as if it were a continued fever.---There is one circumstance, however, which *has convinced him* that it is a *semitertian*.---This is, an agreement of all those who have had, or have seen, or have treated the disease; in the *following observation*.---It happens often, that a patient to appearance becomes greatly *relieved*, and in a state as if he were recovering; when all at once *a fresh attack takes place*, and carries him off.

(D.) This disease (when it takes place in so violent a degree,) is so very frequently fatal, that it seems rather to have confounded practitioners, and made them employ all kinds of the most violent *Remedies* they could think of; as if a very violent and fatal disease could only be got rid of by very violent means.---Some practitioners have taken away large quantities of *blood;* some have *purged* largely; some have given large quantities of *mercury;* some have thrown *cold water* upon the patient.---All these and other violent measures seem to have enhanced the danger; and rendered the disease much more fatal, than it would have been, if it had been left to go through its ordinary course. It would indeed seem not at all proper to exhibit medicines which are not found to avail in ordinary and less dangerous cases of the disease.

There does *not* seem to be so considerable a degree of general inflammation, as to render it necessary to make evacuation by *bleeding.* * * * The general inflammation is not so great as to prolong the paroxysm and thus to require this evacuation; (and the author has before affirmed, that bleeding from any large vessel indiscriminately, in any part of the body, has no power of diminishing or carrying off fever.) As far therefore as he can judge, he should expect no advantage, but great mischief, from taking away a quantity of blood, or repeating the evacuation. He thinks it would hardly ever be prudent, to take away blood at all.

Purging (as has been said in former Dissertations) excepting so far as to keep the bowels free from putrescent matter; is extremely hurtful in fever. The quantity evacuated weakens the patient, and diminishes the powers of the body; so as to render a patient unable to support himself during the course of the disease. At the same time, the alteration in the circulation arising from the purgative, (causing a larger flow of blood to take place in the interior parts of the body,) makes the effort in the hot fit to produce a perfect crisis or greater relaxation of the paroxysm, less efficacious: (for its efficacy depends on the uniformity of its action in every part of the system, as the author has formerly pointed out.) The author must therefore be of opinion, that large evacuation by purging is very detrimental, instead of being useful in this disease.

Mercury cures the venereal disease; which no other medicine will cure, (or at least not with any degree of certainty;) and physicians have seemed to have concluded, that whatever medicine will cure one disease, which no other medicine can cure; will cure all diseases, which no other medicine will cure. This supposition has occasioned mercury's being employed in a variety of diseases, where it evidently does much mischief. It has also occasioned it to be employed for many purposes, for which other medicines are much more adapted.---Mercury has been employed in all cases of fever, of an ordinary degree of intenseness, (whether continued or intermitting,) by various practitioners; without any sensible good effect, either in producing crisis, occasioning more perfect relaxations, or shortening the ordinary course of the disease. It is evident therefore, that it is imprudent to exhibit it in these most violent fevers.

(F.) The next thing that requires consideration is, *whether we should leave the fever to go through its ordinary course;* (as although it is a very dangerous disease, it is by no means always fatal, but in many cases has gone off when left entirely to itself :)---or whether some effort is to be made to carry it off:---or whether some medicine may not be employed to make it go through its course with less danger?

Preparations of antimony, ipecacuanha, and other medicines, have been shown to produce symptoms similar to those taking place in the ordinary crisis of fever: and these (especially Dr. James's powder) have frequently been employed in this very violent disease.---The patient's stomach very soon becomes so extremely irritable; that any dose of such medicines as might be expected to be efficacious, has produced vomiting; (which when taking place in any great degree, has hardly ever been got over; but has destroyed the patient.)---The author conceives that preparations of antimony, (of which he has in a former Dissertation said that tartarized antimony is the best known,) if they have any chance of carrying off the disease, by producing symptoms similar to those which take place in the ordinary crisis of fever; ought to be exhibited immediately on the attack of the disease.—This immediate exhibition of them (he apprehends,) has been prevented; either in the first place, by the great depression of strength and perfect apathy of the patient, which arise immediately on the attack of the disease: secondly, by the general want of energy of the inhabitants of very hot climates; thirdly, by the hurry taking place in all military operations, (this disease being particularly apt to arise in armies in very hot climates): and lastly from the great hurry of practitioners, when a town, district, or country, is seized with an epidemic disease.

The author can say nothing from his own experience; but should be disposed, at the moment of the attack of such a disease, to employ as great a dose of tartarized antimony as the patient could bear

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disease, which (as the author has already said) he caught by surveying the marshes on the banks of the Euphrates; in order to form a plan for draining them. These notes are preserved by Arrian.---Neither the *Greek physicians*, (in the time when the Lacedemonians and Athenians contested the dominion of the coasts of the Mediterranean and other parts; or during the [Macedonian or] Roman Empire;) *nor the very few Roman physicians* whose works have come to us; were conversant in diseases of countries, the heat of which was generally, *for any considerable part of the year, above* 90° *of Fahrenheit's thermometer* in the shade, or in the night time.---The author therefore has not been able from their works, (which are the great foundation of all medical knowledge,) to investigate the history or manner of treatment of those semitertians, which are between those which so much resemble continued fevers, and those which Greek physicians have described.

The author must therefore rely for farther information upon the very few *modern* accounts, which can be depended upon. These have been published by practitioners who have practised for a considerable time in very hot climates; and who had before received a regular medical education.—Beside these, he has received information from those who have lived in such climates, and have attended patients afflicted with the disease; as well as from patients who have themselves gone through the disease.

The semitertians now to be treated of, begin at once with an attack of the *first stage of fever*. There is generally chilness; and not uncommonly rigor and horror; and considerable depression of strength: but not that total carelessness about every thing, which takes place in the fever just described. There is dryness of the skin; and nausea. The chilness is followed by heat; great thirst takes place; and the pulse becomes frequent (to a hundred and twenty, or a hundred and thirty strokes, in a minute). Most commonly the tongue is also dry, and covered with a whitish fur. There is often violent pain in the forehead; evidently in the external parts (that is, those without the cranium). In the *first paroxysm*, which observes the tertian type, there is hardly any appearance of remission; except it be that the pulse becomes somewhat less frequent about thirty six hours after the attack.---The *second exacerbation* does not take place in the evening; but between six o'clock in the morning and five in the afternoon; and after the second exacerbation, something more like a crisis takes place: which result is more conspicuous after the third and fourth.---If the disease should continue longer, and have less appearance of crisis; the paroxysms run more into each other. Delirium, if it did not take place before, often arises; and the disease is frequently fatal.---Nevertheless it sometimes terminates its course, if left entirely to itself, in two or three weeks; and the patient recovers much more frequently than in the case just before described.

It happens also very commonly in this case of semitertian, that during the beginning, in the violence of the attack and hot fit; no evacuation takes place from the intestines. During the relaxation from the paroxysm, diarrhœa however takes place; but it ceases upon the recurrence of a fresh paroxysm of the disease: and when this happens, it weakens the patient; and adds considerably to the danger.

In a semitertian, such as has here been described, *no time is to be lost;* the disease being very often full as acute, as a continued fever in temperate climates: (that is to say, it often terminates in the second, or at most in the third week of the disease).

It hardly ever happens, that there is such a degree of general inflammation as to require evacuation by bleeding: and if bleeding be not necessary, it is always hurtful, by weakening the patient.

The *primæ viæ* ought to be cleared immediately upon the attack, by an emetic and laxative, (such as have been described in treating of irregular tertians); and in doing this there must be no delay.

Medicines (such as preparations of antimony, ipecacuanha, &c.) which have a tendency to produce such appearances as arise in the ordinary course of a regular fever, are to be exhibited during the time of one or two attacks and remissions: afterward, without waiting for a perfect intermission, the bark of the cinchona is to be exhibited in the best remission that can be procured, every hour; and in as large a quantity as the patient's stomach can bear. If the stomach should reject a small quantity of it (such as forty grains), or if it should occasion purging; a moderate quantity of opium, (such as five or six drops of tinctura opii, or a proportional part of a grain of opium,) with five grains of the pulvis aromaticus of the London Dispensary; may be given along with each dose of it.---The powder of the cinchona is to be given during the last eighteen hours of the paroxysm and remission, if the fever observes the tertian type, (which it generally does). Afterward the bark should be omitted, (whether the paroxysm return or not,) for twenty four hours; and then be repeated again: and this practice is thus to be continued, till the disease is carried off, (if it can be effected by this medicine).

The effects of inflaming the skin in any part of the body, bleeding with leaches applied to the temples, or any other remedies which have been said in former Dissertations to be useful in the disease; the author can in no wise judge of; as he has not had any opportunity of observing them himself. Neither has he been able to collect their effects, either from the authors who have treated of such diseases; or from those persons who have seen or been affected by them, with whom he has had an opportunity of conversing.

6*th*. The author now returns to *irregularities* which take place in such intermittents as happen in *temperate* climates.

(A.) It happens not uncommonly, that *in an intermittent of any type*, the quantity of blood thrown upon the lungs in the attack of the disease occasions *Cough;* attended with expectoration; (especially when the fever has continued for some time.)---At the beginning, the cough and difficulty of respiration are often without any expectoration. Sometimes also during the time of the paroxysm, the cough is without expectoration; but expectoration takes place during the time of the remission or intermission.---This affection of the lungs is sometimes *somewhat similar* to peripneumony, but more frequently to catarrh; or rather to a mixture of catarrh and peripneumony.---In either case, *general inflammation* (such as has been described) sometimes takes place. The pulse becomes hard and frequent; without being full and strong; or without being attended with affection of the brain, or tension in the whole system (such as have been enumerated.) The frequency and hardness of the pulse continue during the intermission; and give an appearance of remission only, and not of intermission of the disease.---When this cough goes on *for any length of time*, the pulse becomes contracted and small; continuing at the same time hard and frequent. The natural evening paroxysm of fever is considerably increased. The proper attacks of the intermittent (whether it be tertian or quartan) are rendered more obscure. The patient is weakened and emaciated. The natural evening paroxysm also goes off with sweating between four and five o'clock in the morning;---so that the disease puts on the appearance of, and has often been mistaken for, *Phthisis*.

If such *inflammatory affection* of the breast should *arise soon in an intermittent;* it becomes necessary, (beside employing the methods already recommended to produce perfect intermissions,) to bleed upon the skin of the breast; by means of leaches or scarification, or of the application of cupping glasses. The skin of the breast should be inflamed by blisters. Expectorants (such as gum ammoniac and squills) ought to be employed. Mucilaginous and oily medicines are to be exhibited; (to defend the mucous membrane from the stimulus of the neutral salts of the thin mucus which is secreted.)---If by these means the inflammatory appearances (whether they were peripneumonic, or catarrhal) be entirely got the better of, or very much relieved; we are next to endeavor to prevent the *return of the paroxysm.*---This is to be attempted, in the first place, by employing a purgative immediately on the going off of the paroxysm. An hour before the attack of a fresh paroxysm is expected, we are to exhibit ipecacuanha or antimony; along with stimulants and opium. We are then to lay the patient in bed; and to give him frequently warm watery fluids to drink, along with mucilaginous substances, in small quantities; so as to endeavor to produce sweating. By these means, the paroxysm is often prevented from taking place: (the manner of accomplishing this having already been fully described.)---It is better to attempt to carry off the disease in the first place, by these means, than to employ the bark of the cinchona; (for this bark is apt to increase the inflammatory affection of the thorax.)---These remedies however do not counteract the accession and prevent it from taking place: and therefore if the inflammatory symptoms of the thorax have been in a great measure subdued by the remedies which have been just mentioned; then the cinchona is to be employed during the intermissions (as has been stated in the second Dissertation,) so as to put a stop to the Disease.---The cinchona, however, is by no means to be made use of, if the inflammatory affection of the thorax be not subdued in a very great degree.---When the patient has been considerably weakened, and the ordinary evening paroxysm of fever has much increased, so that hectic symptoms have come on; the author hesitated very much in the beginning of his practice, whether it were proper to employ the cinchona with a view of putting a stop to the disease: but from trying various treatments in many cases, he is satisfied, that it is by much the best to employ the cinchona in large quantities, (as has been before described.)---With any practice, however, the disease in this case is not uncommonly fatal.

(B.) The next danger which is apt to take place, arises also from the blood's being propelled from the exterior parts, (in the time of the attack,) to the *large internal vessels:* but especially to the vessels of the *abdomen;* and particularly to those of the spleen and liver.---The *Spleen* becomes enlarged and hard, and sinks lower in the abdomen; so as to appear as a hard *Tumor* there. Upon dissection after the death of the patient, it has been found much enlarged, hard, and particularly unequal in its internal appearance. The whole abdomen in this case is swelled; or there is rather the feel of a hard circumscribed tumor in it. The patient perceives a sense of weight and distention; the digestion does not go on well; and costiveness is apt to take place. This case however is not very fatal.---A like swelling and hardness are apt to arise in the *Liver*. The tumor in this case is more in the region of the liver; and does not descend so low. Upon dissection the liver has the same appearance of hardness and inequality.---There are [other] *Tumors* in the abdomen, so situated and so arising, that the author cannot believe they can be affections either of the spleen or of the liver; but he has not been able to find any case of a patient's having been opened, where the tumor subsisted in any other part.---These Tumors have been called *Ague Cakes*.---They arise more frequently in quartans than in tertians, and more frequently in tertians than in quotidians.

These Tumors do *not seem much to alter the progress* of the disease;---nor do they seem to prevent the disease *from being carried off*, either by the ordinary progress of the fever itself, or by the exhibition of the cinchona or of any other remedy (which has been employed to carry of the disease.)---If the disease should be terminated either in its ordinary course, or be cured by any medicine; these tumors are left, and often *continue* for many months, or even years; without any great detriment to the patient; as they at last gradually subside.---Sometimes when they have arisen after a quartan has continued for a month or two; they have again subsided, after it has continued for two or three months longer; and before the quartan has finally ceased.---When a fever has ceased of itself, or has been carried off by any medicine, and these tumors have been left; they are always distressing, and often hurtful in a considerable degree. The patient is uneasy; his appetite is more or less diminished; he feels a sense of weight and indisposition to action; the peristaltic motion of the intestines, does not go on regularly, the color of his skin does not recover its clearness; and, though not so ill as to be prevented from going through his ordinary business, he is nevertheless languid.---If from any cause the intermittent should recur, and continue for some time; it is still not uncommon for these tumors to subside again; and when the disease is carried off by medicine or goes off by its ordinary course, the patient recovers his health perfectly.

(C.) In many cases, a *Tumor arising in the Liver* (from the same or any other cause) produces *hardness*, like *scirrhosity*, in various parts of the viscus.---These tumors, by *pressing upon* the branches of the vena portarum (which passes into the liver and there divides its course in the manner of an artery;) prevent the blood from returning from the abdominal viscera with its usual facility.---The passage of the blood being thus retarded, occasions a greater extravasation of lymph into the cavity of the abdomen; so that the ordinary exertion of the absorbents is not sufficient to take up all the lymph: and thus an *Ascites* takes place. The tumor which arises in consequence of the accumulation of water in the abdomen, pressing upon the liver, increases the scirrhosity there; and this case generally becomes fatal.---These apparently scirrhous tumors not uncommonly press on the ductus communis coledochus, the duct of the gall bladder, the hepatic duct, or the ducts which have been commonly called pori biliarii, (but which the author would rather call hepatic ducts). Such pressure upon any of these ducts may prevent the whole or part of the bile from getting into the duodenum; and by occasioning it to be absorbed, may of itself produce jaundice (without any concomitant dropsical symptom); or along with it, ascites. When this happens, the disease is generally fatal.---When ascites is occasioned by such schirrhus-like tumors produced in the liver in intermitting fevers; the skin often assumes a dirty yellowish brown color. This color the author rather attributes to the coloring part of the rete mucosum, or to the sebaceous matter secreted by the glands of the skin; than to bile absorbed, or to its not flowing into the duodenum.---There is no appearance which shows that bile does not get into the intestines, (such as want of color in the fæces, &c.); or that it has got into the blood-vessels, (such as the urine's becoming of a yellow dye, &c).---The anthor has already shown, that no bile is ever contained in the blood-vessels, unless it has been *previously formed in the liver* and absorbed.

(D.) The same determination of blood from the blood-vessels upon the *abdominal viscera*, when the patient becomes weak after an intermittent, has continued for two or three months or longer ; and sometimes occasions an increased *secretion from the glands of the intestines*. Thus *Diarrhœa* is produced.---This diarrhœa, (like that which has already been described as taking place in the intermittents of hot climates ;) is more severe during the remissions and intermissions ; and is less severe, or ceases altogether, at the time of the accession, and during the time of the paroxysm.---Such diarrhœa tends to increase the weakness considerably;---Frequently this weakness occasions *Dropsical* appearances. At first œdematous swellings appear in the lower extremities ; which increase ; rising up to the thighs, and then to the integuments of the abdomen.---Ascites also takes place.---This is an accident very dangerous and difficult to get the better of. If astringent remedies be employed, so as to put a stop to the diarrhœa ; the dropsical appearances increase ; and the intermittent continues to recur, (although often very obscurely, and very irregularly). If the diarrhœa be allowed to go on, or if it have been stopped, and be allowed to return by leaving off the astringents ; the weakness increases in such a degree as to destroy the patient.---If the bark of the cinchona be exhibited, it often increases the diarrhœa ; without having the effect of preventing the irregular returns of the attacks or exacerbations.---It appears therefore to the author to be best in this case, first to clear the primæ viæ, by employing about twenty five grains of rhubarb ; and after its operation to exhibit cinchona in pretty considerable quantity, (such as a dram every three hours) ; and to give at the same time a grain of ipecacuanha, with fifteen drops of tincture of opium (or else opium in proportion,) together with a moderate quantity of any of the warmer spices, every four hours.---The author, however, is very far from saying, that this practice is always efficacious in curing the disease ; which, when it has been allowed to run on to this state, is not uncommonly fatal.

(E.) Suppose that *no tumor* has arisen in any of the abdominal viscera, (so as to compress either the lymphatics or the veins,) and that *no diarrhœa* has taken place ;---yet it happens not uncommonly, when an intermittent has run out to a great length, that such weakness arises as to produce a *Dropsy*.---This happens more frequently in quartans, than in tertians; and more frequently in tertians, than in quotidians.---First of all, œdematous swellings begin to take place in the lower extremities. These (as usual) increase while the patient is in an erect, and diminish when he remains for some time in nearly a horizontal posture; and as he is generally in an erect posture during the day time, they are greater in the evening; but as he is in a horizontal posture during the night, they are less in the morning.

Beside this increase and diminution of the tumor, (in consequence of the patient's being in an upright or in a horizontal posture); an increase of the tumor takes place during the intermission; the tumor being (as far as the cause just mentioned allows it) greatest at the end of the intermission. When the paroxysm comes on, it diminishes; and during the time of the paroxysm it totally subsides, (if the weakness have not become very considerable).---The increased exertion of the lymphatics during the hot fit appears to occasion a total absorption of the lymph; but the want of this exertion during the day in which no paroxysm takes place, allows the lymph to be accumulated in the cavities.

Supposing the disease to be left entirely to itself, and to terminate by a more severe exacerbation, producing a perfect crisis; or by the disease wearing itself out and gradually subsiding; this dropsy is very rarely fatal. After the disease is gone off, if the strength be restored, the lymph is absorbed; and the patient regains his former health.

If the fever should go on, the tumor rises higher; occupies first the integuments of the abdomen, and the cellular membrane among the muscles of the loins; afterward ascites is joined with it; the functions of the intestines are hurt, and the patient sinks: the external appearances of the dropsy becoming gradually nearer to *phlegmatia*, than to anasarca,

When the bark of the cinchona, (or other remedies having similar effects) prevent a return of the exacerbation; then the exertions of the lymphatics during the hot fit, and the absorption of the lymph, do not take place; the lymph is not absorbed; and the dropsical symptoms appear to be very much increased.---The dropsical symptoms appearing thus to increase, when the intermittent has been stopped by the cinchona (or other medicines having a similar effect), have occasioned an opinion, that the cinchona gave occasion to the dropsy ; and the practice of exhibiting it has hence been reprobated by many practitioners.---It is to be observed however, that such dropsical symptoms have arisen solely from the weakness occasioned by the continuance of the disease. It is farther to be observed, that the increase of the dropsical symptoms, after the paroxysms of the fever have been prevented from returning; is owing to the want of that alleviation of the dropsy which took place during the paroxysm, by the greater exertion of the absorbents during the hot fit. At the same time, this, as well as the other exertions during the paroxysm, tend to weaken the patient; so as to become the very cause of the final increase of the dropsy.---The putting a stop to the paroxysm, therefore, although it prevents the temporary alleviation of the dropsical symptoms; yet at the same time removes their original cause. It would appear therefore from this view, that it is proper if possible, to put a stop to the farther progress of the disease; and so prevent the patient from being more and more weakened.---The author, accordingly, for many years has not hesitated, when dropsy has arisen in an intermittent which has continued long, and there has been no cause to suspect induration in any of the viscera occasioning pressure on the lymphatics or veins ; to exhibit the bark of the cinchona, and to endeavor by this means to prevent the return of the paroxysm. He has found in such cases, that the dropsical appearances, although they *at first increased;* yet as the strength returned, generally began by degrees to diminish ; and at last disappearing entirely, the patient recovered his health.

7th. It happens not uncommonly if *intermittent fevers* have been entirely neglected in the beginning, or when the bark of the cinchona has been employed improperly; (that is, not according to the mode prescribed in the Dissertation on regular tertians ;)---that the *disease runs out to a great length, whatever its type may be.*---It also becomes *irregular ;* varies its type, and is often only a remittent.

In these cases the patient is weakened ; and is apt to sink under such weakness, without any dropsical symptom or affection of the thorax.---When this happens, the pulse always keeps up a degree of frequency. The paroxysms and remissions are sometimes sufficiently distinguishable; but at other times they are hardly to be discovered. The tongue is sometimes constantly covered with a mucus (which is of a whitish or brownish color;) the appetite is lost; and the patient gradually sinks.---He may however remain in a doubtful situation for many weeks; and at length recover.

In such cases (and more particularly in those in which cinchona has been employed improperly, or so as not to cure the disease;) preparations of the *Metals* (such as have been enumerated in the Dissertation on regular tertians) have been employed;---and sometimes with good effect.

Of these, the preparations of *Arsenic* seem to have been the most frequently efficacious.---If it be ever proper to employ any preparation of arsenic internally, the best seems to be the compound of kali with calx of arsenic; (which many modern chemists called *acid of Arsenic;* and which has been known by the name of *White arsenic.)* ---The author has often attempted to give arsenic under various forms, in *cancerous* cases; but although he has taken care to exhibit it in such small quantities, as not to affect the stomach and intestines; yet upon continuing it, such excruciating pain has taken place in the extremities, and such a degree of stupor; as always to force him to desist from it.---Add to this, that it is a medicine so dangerous, that if it happen to be given in too large a dose, it is often fatal. ---It is not to be intrusted therefore in the hands of such young men, as are too frequently employed to compound medicines in the shops ot the apothecaries of this country. Since an error of half a grain in a dose may be fatal; it is not to be trusted to the scales commonly employed in apothecaries' shops, (which are often not sensible to half a grain.)*

Next to arsenic, preparations of *Zinc* seem the most powerful.---The calx which is found in the chimnies of furnaces, in which brass is produced by combining copper with zinc; (and which, when it is of a light grey color, has been called *cadmia;* and if of a dark, dirty blue color, *tutty;)* was formerly very much in use in complaints which return by paroxysms; and among others, in intermitting fevers.---Lately the calx called *flowers of zinc* (formed by exposing to the air of the atmosphere the surface of zinc melted and heated to a white heat,) has been more in use: But the author does not know of any comparative experiment on which this has been grounded.---

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* See the Note at p. 443.

Sometimes likewise *zincum vitriolatum* has been exhibited for the same purposes.

Preparations of *Copper* have been used more seldom; though perhaps, they are as efficacious.---Formerly *cuprum acetatum* was much employed, both externally and internally; though it has now fallen very much into disuse.---It has been conceived, that *copper combined with ammonia muriata,* (in consequence of moistening sheets of copper with a solution of ammonia muriata in water, and exposing them to the air;) is less stimulant in proportion to its other powers; and consequently is less apt to affect the stomach and intestines; and therefore more proper to be employed. The tendency of preparations of copper to affect the stomach and intestines, has made them in general to be considered as a very active poison; which however, (independent of this effect,) is not true. If cuprum ammoniacale however, actually did produce less effect on the stomach and intestines in proportion to its other powers, it would be undoubtedly a more useful medicine;—but as the author has not found upon trial that this is the case; he conceives, that *cuprum vitriolatum* is the most certain of the preparations of this metal.

The preparations of *Iron,* which have been employed in medicine, have been very various; but whether it be exhibited in its metallic form, or calcined, or combined with acids or with alkalis or with neutral salts; its virtues do not seem to be very different.—Its powers of preventing the returns of the paroxysms of an intermittent seem to be less than those of the others of these four metals;—At the same time it has no noxious or deleterious effect.—As a strengthening medicine to keep up the force of the system, during the progress of an intermittent; its powers are very considerable; and it has often been used for this purpose.

But *whichever of these metals,* or whatsoever of their preparations, are employed with a view to prevent the return of the paroxysms of an intermittent; they should be exhibited in as *large doses* as the stomach will bear.—They ought also only to be exhibited in the times of the intermissions.—This rule however is *not to be so strictly adhered to, as in the exhibition of the bark* of the cinchona; (especially if the intermissions have become imperfect, or been converted into remissions.)---In *other respects the same rules* are to be followed, as have been before laid down in regard to the exhibition of the *cinchona.*

A

FIFTH DISSERTATION

ON

FEVER;

CONTAINING

THE HISTORY OF, AND REMEDIES

TO BE EMPLOYED IN,

IRREGULAR CONTINUED FEVERS,

TOGETHER WITH

A GENERAL CONCLUSION

TO THE FIVE DISSERTATIONS.

PRINTED IN 1803, IN LONDON.

ADVERTISEMENT,

BY THE EDITOR IN ENGLAND.

The original of Dr. George Fordyce's *Fifth* Dissertation on Fever, was delivered to me, several months ago, by Miss Fordyce; with a request, which her father (shortly before his death) had desired her to make, that I would superintend its publication. It is in the hand writing of Miss Fordyce; to whom it was the custom of her father to *dictate* what he meant to publish; and in almost every page there are alterations in his own writing; so that no doubt can be entertained of its authenticity.---The author, however, was accustomed to reserve the principal corrections of *any* work he was about to publish, till what are called the proof sheets were sent him by the printer. The present work, therefore, must be considered as in some degree imperfect.—The alterations, which it seemed very obviously to require in point of language, I have ventured to make; and in doing this I have not taken a greater liberty than what he permitted me to use with respect to three of his preceding publications on fever.

WILLIAM CHARLES WELLS.

London, Dec. 12, 1802.

[N. B. The author of the above advertisement was at this time, one of the Physicians of St. Thomas's Hospital in London, and one of the Fellows of the Royal Society in that city; and had been known to the literary world by various publications. He afterwards published a very valuable work on *Dew*, &c. He died in 1817.]

FIFTH DISSERTATION, &c.

In the *Fourth* Dissertation on Fever, the author has endeavored to point out the irregularities and accidents, which are apt to take place in *Intermitting* Fevers.---He comes now, in the last place, to point out the *Diseases* which may be complicated with, and the *Irregularities and Accidents* which may occur in, "CONTINUED FEVERS."

The *Disease* first to be noticed, (as being likewise intermixed with continued fever,) is *General Inflammation*.---This has been described in the Fourth Dissertation, as it arises sometimes in intermitting and remitting fevers; (prolonging often their paroxysms, so that they run into each other; and making them appear, especially at the beginning, to be Continued Fevers;---the only difference being, that the exacerbations take place in the day time, instead of the evening.) ---General Inflammation is apt to take place also at the beginning of *Continued* fevers: and when it does, it alters very much their progress; and occasions a difference, not only in the appearances, but likewise in the treatment of the disease.

General Inflammation is apt to take place in continued fevers, at the beginning of the disease, in men of *strong habits*.---Therefore, it *seldom* occurs in those who live in parts where the *atmosphere is contaminated*, by being mixed with noxious vapors, or by noxious powders or particles of noxious fluids suspended in it; since all of these generally prevent men from acquiring great strength. These noxious substances, diffused through, or suspended in the air, are found more particularly in *great towns*, or where there is a great concourse of mankind. The vapors exhaled from putrefying substances which are found in such circumstances; together with powders ground down by the treading of animals and the rubbing of carriages; the vapors arising from the burning of fuel; and the soil and ashes which are carried into the atmosphere: all tend to diminish the powers of the body. It is but very rarely that general inflammation arises at the beginning of continued fevers under these circumstances.---When men live in the *country*, (where the air is not contaminated by such mixture,) general inflammation in many instances takes place in a very great degree.

Men are undoubtedly formed to live in *warm climates*: since they have no natural defence, such as hair (or that species of it we call wool) or feathers, to protect them from the cold even of temperatures which fall but little below sixty degrees of Fahrenheit's thermometer.---When men live in a climate where the heat of the atmosphere rarely falls below seventy five degrees, (provided the situations which they inhabit are *not moist* from stagnating waters or violent rains;) they commonly enjoy perfect health: at least they are not particularly subject to fevers.---Men are driven from such situations principally by war. An instinct (perhaps the strongest in the human mind) leads them into quarrels between families, tribes, or nations. In such wars, the powerful oblige the weak to quit the most fruitful countries and those most congenial to mankind; and to take up their abode in others less fruitful, and of a temperature which makes it necessary for them to exert their faculties in contriving (in the first place) some means of defence against the coldness and inclemency of the atmosphere.---The exertions necessary for procuring such defence, strengthen the powers of their minds.

There results at the same time, from living in a *colder* atmosphere *an increase of the powers of their bodies*.---It might be thought sufficient to have taken notice of this fact simply: but the author means to *try to explain on what it depends*.---It is necessary that the blood-vessels should always adapt themselves to the quantity of blood, which is contained in them: (That is, they must always be full of blood, and always cylindrical, if they are not rendered of some other shape by external pressure: at least they are always so contracted, when alive.) This property cannot depend upon the *Elasticity* of the blood-vessels; but on a *Contraction*; (similar to that which is exerted by the muscles.) If there should be a smaller quantity of blood in the blood-vessels than that, to which they are at the time disposed to contract, there must be a greater exertion of the blood-vessels to suit the quantity of blood which they contain.

In consequence, the living power must be drawn from some other part, and be exhausted; as it is by the contraction of the muscles in exercise or labor. (It is not necessary that a greater exertion of common muscular power, such as takes place in exercise or labor, should be continued always: indeed this is impossible. A man exerting common muscular power must necessarily come to rest; until the powers of his body are recruited by that perfect rest which takes place in sleep: for if such rest is not allowed, the powers of the system will be expended; and it will be impossible for him to continue the same exertions.)---When there is a smaller quantity of blood in the blood-vessels than that which they are disposed to contain; these vessels are obliged nevertheless to contract, and to adapt themselves to this smaller quantity. This has a similar effect in weakening the system, with muscular motion too long continued.---There is this difference however: That muscular motion may and *must* cease; whereas, since blood cannot instantly be formed, the contraction of the blood-vessels (in order to correspond to the blood which is in them) must constantly exist. Rest cannot take place in *this* exertion; nor can sleep relieve it.---This exertion is the most material of any in the system; for if the blood-vessels have not a sufficient quantity of blood to fill them according to their disposition to contract at the moment; a quantity of power must be drawn from the other parts of the body, to contract them to the quantity of blood which they contain: so that, if the quantity continues constantly to diminish, the living power will be withdrawn from every other function, until the animal dies.

The blood-vessels consist of *Large Arteries* gradually branching off into smaller ones; and these last terminate in vessels opening into each other, called anastomosing arteries and veins. These anastomosing arteries and veins, have blood flowing through them in every direction: (that is to say, blood enters sometimes into either end of them, and flows out with rapidity at the other end; sometimes entering at the end at which it formerly flowed out, and with the same rapidity flowing out at the end into which it formerly entered.) Those small vessels which are continuations of arteries, throw the blood into a set of smaller vessels of the same description; and these again into a set of still smaller vessels likewise of the same kind; until at last the blood is thrown into a set of vessels which no longer diminish. These throw the blood into another set of similar vessels which are larger, these again into a set of vessels which are still larger, and these terminate in vessels called

Veins; which carry the blood towards the heart.---It has been common to call the anastomosing vessels, while they are diminishing, anastomosing arteries; and when they begin to increase again, anastomosing veins: but as the vessels of the smallest set neither increase nor diminish, it is impossible to call these either arteries or veins. The author would therefore give them some other name; and, from their extreme minuteness, he joins with those who have called them *capillary vessels.*---All these vessels (the large arteries and veins, and the anastomosing and capillary vessels) must contract so as to be always cylindrical, and always full of blood.

It may be easily conceived that the exertion used in contracting one set of blood-vessels, may exhaust the Living Power more than the exertion used in contracting another set of them. (That is, the exertion of the arteries before they begin to anastomose, and of the veins after they have received the blood from the capillary vessels, when contracting so as to adapt themselves to a less quantity of blood; may exhaust the living power, more than the contraction of the capillary vessels themselves.)---That this is really the case, appears from the following observation; namely, that to kill an animal, it requires a much less quantity of blood to be taken from a large artery or a large vein; than from a small artery or a small vein: (sometimes not half the quantity.) When a large blood-vessel is opened, and the blood flows very fast from it, the large vessels are more evacuated; and the animal is destroyed: the small vessels not having time to contract, and replenish the large vessels with blood.---Consequently, the contraction of the large vessels exhausts the power of the body more, than the contraction of the small vessels.

The large vessels (both arteries and veins) lie principally in the interior parts of the body; while a greater number of small vessels are found in the external parts, than in the interior.---When a man is in a warm atmosphere (or surrounded by any other warm medium,) the heat occasions a much larger quantity of blood to circulate in the exterior parts, where the small vessels abound: in consequence of which the large vessels are emptied of blood, and obliged to contract to a greater degree.---Hence those living in warm climates have their strength thus exhausted.---But in cold climates, the cold contracts the vessels on the surface, and keeps full the large vessels in the interior: and the powers of the body not being exhausted by their contraction, the vigor of the whole system is suffered to increase.

Countries are cold, in the first place, as they are more distant from the Equator, (especially in winter): general inflammation may be expected therefore, in continued fevers, most frequently in countries in high latitudes.---In the second place, coldness is found in countries in proportion as they are elevated above the level of the sea; and hence general inflammation is often found in such fevers in mountainous countries, and in the middle of continents.---Again; since in the winter the atmosphere is cold, while in the summer it is warm; general inflammation is to be expected more frequently in the spring, than in the autumn.

When general inflammation happens at the beginning of an *Intermitting* fever, (and prevents perfect intermissions from taking place;) there is no difficulty in the question, whether it should be taken off by large evacuation by bleeding; because, when the intermissions become more perfect, there is time for sufficient food to be digested so as to replenish the blood-vessels:—But in *Continued* Fevers this question meets with greater difficulty. In continued fevers, where we are not to expect any such remission as will allow food of great nourishment to be digested, so as to replenish the blood-vessels, and to take off the exhaustion of the living power (occasioned by the necessary contraction of the vessels, in order to adapt themselves to a smaller quantity of blood); the practitioner should strictly weigh the following argument.—There are three dangers: one, lest an increased action of the heart and arteries should throw forward such a quantity of blood upon the brain, as to induce a fatal delirium: a second, lest the same action should so hurt the brain as to make it unable to bear that mischief which induces such delirium, as has been already described in the Treatise on Regular Continued Fever; and lastly, lest the tension produced by the blood being thrown (by the strong action of the heart and arteries) into the small vessels throughout the system, should be suddenly taken off; and the patient should sink. These reasons on the one hand, induce a necessity of removing the general inflammation as quickly as possible; by making a large evacuation by opening a blood-vessel.—On the other hand, supposing that, after having made such evacuations, the practitioner should not be able to carry off the disease by the means laid down in the Treatise on

Regular Fever; it would then of necessity go through its course:—And the following difficulties would occur. In the first place, a degree of weakness is then induced, which (added to the depression of strength arising from the fever) often produces symptoms of putrefaction in the second week of the disease, so as to prove fatal; (of which many instances have come under the author's observation). In the next place, supposing such symptoms of putrefaction not to have made their appearance, yet a fatal degree of weakness has arisen towards the end of the fever; (from the living power being obliged to exert itself in contracting the vessels to the smaller and smaller quantity of blood that is left in them). This happens, first, from the evacuation made by bleeding; and secondly, from the want of powers of digestion to form a sufficient quantity of blood, if even food could be exhibited: whence the patient has sunk and been destroyed.—The author cannot help lamenting on this occasion, the terrible proposition laid down in one of the aphorisms of Dr. Boerhaave; namely, that it is difficult to diminish the strength at the beginning of fevers; but easy to support it towards the end: the contrary of which the author has found by long experience to be true. (This proposition of Boerhaave, from the year 1750 to the year 1760, destroyed more men than fell in battle in the whole of that period, during two dreadful wars in Europe.)—It will well behove therefore a practitioner to weigh both sides of the argument, before he proceeds to employ the lancet at the beginning of Continued Fevers.

If the danger from the general inflammation is *great;* and if it very much overbalances the mischief that would arise afterwards: he will then undoubtedly take away a quantity of blood by opening a blood-vessel.—If this should be the case, the following rules are to be observed—In the first place, the practitioner should weigh well in his mind the danger arising from the general inflammation, with the general strength of the patient; and from thence determine *what quantity* of blood it is necessary to take away at once, to remove the danger from the general inflammation; (without so weakening the system, as that the patient shall sink towards the end of the fever).—That is to say, if the general inflammation is *great,* and the symptoms from it very dangerous; and if at the same time the strength of the patient when he was attacked by the fever was also great; it will be necessary to take away as large a quantity of blood at once, as sixteen or twenty ounces; (which may be done with safety a[illegible]dvantage.)—On the other hand, if the danger from the general inflammation be but *trifling*, and the patient was weak when attacked with the fever; it will be better not to take away any blood at all: but rather to run the risk of the mischief which may arise from the general inflammation; than of that which may take place from putrefaction if the fever be very violent, or of the weakness which may occur towards the end of the disease.—If there should be a *less considerable* degree of general inflammation, but still danger from it, (even though the fever should not be very violent); and if the patient was not very weak when he was attacked by the fever: it may be necessary in this case also, to take away a quantity of blood; but the quantity should be less. (However, it rarely happens that there is danger from any degree of general inflammation, if it can be obviated by taking away *less than ten ounces of blood.)*

It has been the practice in many nations and among many practitioners, to take away a small quantity of blood at once, such as perhaps four ounces; and if this does not succeed in removing the danger from general inflammation, to take away four ounces more in a few hours: and so to proceed, until the danger from the general inflammation is removed: And this practice at first sight seems very rational.—The reasoning however which we have before laid down must be applied to this point. It has been said, that emptying the large vessels produces a greater temporary weakness, than emptying the small vessels; and that if a large quantity of blood is taken away at once, the large vessels will be more emptied, (as the small vessels have not time to contract so as to replenish the large vessels with blood: and therefore that an animal will die sooner if a large quantity of blood be taken away at once, than if the same quantity be taken away at intervals:) and that, of consequence, a greater degree of *temporary* weakness will be produced by taking away a large quantity at once; and a less degree of *permanent* weakness. Now we wish in fever to produce a great degree of temporary weakness, so as to get rid of the danger arising from the general inflammation; and at the same time to leave as little permanent weakness as possible; (so that there shall be strength enough left in the system to support the patient during the remaining part of the disease.)

It is certain, therefore, from all these circumstances, that a practitioner should weigh well the danger from the general inflammation, and the danger from the weakness; and if necessary, take at once boldly the quantity of blood necessary to remove the danger from the general inflammation, (if it be ten, twelve, fifteen, twenty, or even four and twenty ounces.)—On the other hand, if there should be general inflammation, and yet not in so great a degree as to threaten any material mischief; he must be as obstinately resolved not to take away any blood at all.

There is still one more situation in which it may be necessary to take away blood at the beginning of fever.

It has been observed in a former treatise, that there is a *General Contraction* of the vessels, especially of the small vessels, in fever. If the blood-vessels should be very full of blood, (which sometimes happens to persons between the age of fifteen or sixteen, and thirty or five and thirty;) and if such persons should be attacked with fever; the quantity of blood is so great in proportion to the tone of the vessels, as to fill the heart and arteries to such a degree, that they have no longer (if the author may use a vulgar expression) *Room to play:* (That is to say, there is such an influx of blood into the ventricles of the heart, as not to suffer them to contract, so as to empty themselves entirely, before a fresh quantity of blood is thrown in from the auricles; and in like manner, blood is so quickly thrown from the heart into the arteries, that these have not time to contract themselves completely, so as to empty themselves of blood into the capillary vessels, before a fresh quantity is thrown into them by the heart.) This state of the vessels is called *Plethora.*—It is pointed out by a particular feel of the pulsations of the arteries; they feeling always *full, and hardly receding from the finger.* When this happens, the finger discovers a very small difference between the contraction and relaxation of the artery; the artery appearing always of considerable size; with a kind of feel of softness.—This feel in the pulsation of the arteries has been called *Oppression of the pulse.*—If the pulse should be very much oppressed, (which it hardly ever is in persons of a different age from what has been already mentioned;) it will be necessary, in order that the hot fit of the fever may operate so as to produce relaxation or crisis; that some blood should be taken away. Taking away eight or ten ounces is always sufficient for this purpose.

The author wishes it to be understood, that these reasons for taking away blood at the *beginning of fever* must be clear to a practitioner, before he ventures to open a blood-vessel with a lancet. (There have been more patients destroyed by a contrary practice in fevers, such as he has defined them, than by any other whatever.)

The author having shown, in the Third Dissertation, the circumstances in which taking away *Blood* from particular parts of the body is of use in fevers;—and likewise the accidents which arise from disposition to *Putrefaction*, and the means of obviating them:—comes now to treat of *the Other Irregularities* which take place in continued fevers.

1*st*. The first irregularity which is left to be taken notice of is, *the fever not affecting every part of the system equally;* the symptoms being less severe in one part than in another; (as for instance, there being little or no pain in the forehead.) The young and inexperienced practitioner thinks, (and the by-stander in a much greater degree,) that the mildness or total want of some symptom of the fever; is very fortunate for the patient. In fact it is the very reverse, there being nothing more dangerous in fever than its not affecting every part of the system in an equal degree.—It is true indeed, when *all* the symptoms are equally mild, and *every* part of the body equally little affected; that the fever, if left to itself, (although there be a less chance of a crisis,) will go through its course with less danger to the patient. It will also more readily yield to the application of medicines which produce appearances similar to those, which take place in a crisis; and the disease will be more readily carried off by them. ---But this is far from being the case, when the symptoms are mild in *one* part of the body, and severe in *another*.*---It will therefore

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* Dr. Rush and some other authors have noticed this most important fact.—Does this incident arise from a defect or an excess of action or of sensibility in some vital part of the system, newly produced in it on this occasion, or else previously existing in it, though unobserved; or from both? or from an unequal agency in the cause or in the consequences of the disease, by which means some important part of the system is affected with a disproportionate and fatal severity?—The danger is found to be so imminent, that it may become a question, whether an attempt to equalize action or irritability in the system, may not sometimes in these cases enter into the plan of cure?

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manha, &c.) tending to produce symptoms similar to those which take place in the crisis of fever, has its whole force exhausted upon those parts, in which the appearances of fever are slight; without at all affecting those parts which are most afflicted by the disease. (For example; if there should be considerable pain in the forehead, and the skin should be soft and moist; then upon preparations of antimony being exhibited, the patient will fall into a profuse sweat, without the least relief of the pain in the forehead.)---It is farther to be observed, that not only if there should be a want of febrile symptoms in any one particular part of the body; but if even those appearances should arise, which take place in a crisis, in some particular part of the body, and not in the whole at the same time; the mischief is much greater, and the patient in such case rarely recovers. (If, for example, there be a lateritious sediment in the urine from the beginning of the disease; or if it take place before the middle of the second week, and neither the head-ach nor delirium be in any way diminished; if the skin should remain hot, contracted and dry, the tongue covered with a mucous crust, and the pulse continue of equal frequency: it hardly ever happens that the patient recovers from the disease. In like manner, the skin having been dry and contracted at the beginning, if a profuse sweat afterwards take place, and continue for some time without any diminution of the other symptoms of the disease; that is, if there should be no lateritious sediment in the urine; if the costiveness and the head-ach should continue: instead of these being *favorable* appearances, we are to expect that the disease will prove *fatal.)*---Independently of the mischief arising from inequality in the disease, any evacuation will weaken the patient, and render him incapable of supporting the further progress of it; (when there is not at the same time an alleviation of the other appearances of the disease.)

If any symptom of the disease should be wanting, and the others be present in as great a degree as when the body is equally affected; there is no remedy at present known, which will increase the particular appearances of fever in those parts in which they are wanting: nor (as far as the author knows) has it ever been attempted to increase the appearances of fever in those parts where they have been wanting; so as to give success to the efforts towards a crisis arising in the ordinary course of the disease, or after the application of such medicines as tend to produce appearances similar to those which take place in the crisis of fever.—For example: when there is no pain in the forehead, (while all the other symptoms of the disease are very violent,) no attempt has been made to produce pain in the forehead; in order to render the efforts similar to those made in the ordinary progress of the disease, (where medicines act equally upon the whole system, so as to carry off the disease.)—When the want of a sufficient degree of fever in any part of the body has been attended with considerable *Evacuation* from that part; then indeed means have been employed to put a stop to such evacuation; and so to prevent the mischief arising from the weakness it would produce.—If profuse *sweating* should arise without any relief of the fever, astringents have been employed to contract the vessels of the skin; (such as the mild vegetable astringents, or infusion of red roses, agrimony, hypericum, and others of the same kind; along with the vitriolic and muriatic acids:) and these are frequently efficacious. The patient at the same time should not be covered with too great a quantity of bed clothes: though this is to be regulated by the heat of the atmosphere.—If there should be *purging* without any relief of the disease; after exhibiting a moderate quantity of rhubarb (from twenty to thirty grains for example) to clear the primæ viæ of their contents; it is proper to give small doses of opium, such as from ten to fifteen drops of the tinctura opii every six hours, and along with it some moderate astringent; (for example, about ten grains of tormentil root every six hours.)—If the patient should have very considerable strength, (as is often the case in the first week of the disease,) and purging should arise; it is not proper that any astringent should be employed so powerful as those just mentioned. The practitioner must trust to clearing the primæ viæ with a small quantity of rhubarb; and exhibiting a grain of ipecacuanha every six hours; or any other medicine which will determine the circulation to the exterior parts of the body. Chalk or bone ashes are the most powerful astringents which ought to be employed in this case.—If, notwithstanding the use of these milder astringents, the evacuation should still continue, and the patient's strength be considerably diminished; recourse must be had to more powerful astringents, (such as have already been proposed.)

2*d*. The next irregularity which happens in continued fever is in *the Progress of the disease.*

If a fever should begin either with mild or violent symptoms, but which are *equal* throughout the system; if it should then gradually increase during the first week, or perhaps to the eighth or ninth day; if the symptoms should afterwards continue nearly with the same violence to the end of the fourteenth or fifteenth day; and if it should then begin to diminish gradually and wear itself out, so as to leave the patient on or before the twenty first or twenty second day of the disease;—and if in proceeding thus, it should *not observe any critical days*;—the treatment has already been pointed out in the Dissertation on Regular Fever.

If on the other hand, a fever in temperate and cold climates should *observe critical days*, and be entirely left to itself; these critical days ought to become apparent in the first week of the disease: (that is, the aggravations of the fever ought to be very apparent on the evening of each day; and the relaxations in the morning ought likewise to be very considerable; only that the aggravation of every subsequent day should be more severe than that of the preceding day, and the relaxation in the morning proportionably less.)—If the fever should then change its type on the sixth or seventh day, and the exacerbation on either of those days be more severe; and if there should be some appearance of critical symptoms in the morning after such severe exacerbation, but on the seventh or eighth evening the symptoms of exacerbation should not be so considerable, and the symptoms of relaxation or crisis on the following morning should not be so great: and again, if the symptoms of aggravation should be more violent on the eighth or ninth day than they were on the seventh or eighth, and so on during the farther progress of the disease, until it changes its type from the tertian to the quartan, (which commonly happens on the fourteenth day:) then, (if critical appearances do not arise on the fourteenth day, so as to carry off the disease,) the disease ought at least to have less aggravations at the beginnings of the fifteenth and sixteenth days, and the relaxation in the morning should be more considerable on the sixteenth day; a somewhat stronger exacerbation also should take place on the following evening than did on the beginning of the fifteenth or sixteenth day; and during the night more perfect critical symptoms should take place, and the patient be much relieved in the morning.—There should be still slighter exacerbations on the eighteenth and nineteenth, and there should be a stronger exacerbation and a perfect crisis on the twentieth day; or the few remaining symptoms of the disease should gradually wear off.—The treatment under these appearances has been pointed out in the Third Dissertation.

If in the *first* case which we have put, (that is, where the disease observes no *critical days*;) the disease instead of gradually increasing to a certain height, then remaining at that height for the time that has been stated, and afterwards gradually diminishing and going off; the patient should sometimes be better for two or three days and then grow worse, and the symptoms should again abate for a day or two and then return with greater force; and so continue for the first three weeks of the disease: the fever (instead of gradually leaving the patient) will now often continue and fluctuate for four, five, or six weeks, or longer; and the patient will be cut off at last, in many cases, by weakness.—When a practitioner therefore finds a fever thus to deviate from the ordinary course, in the first fortnight; he ought to be very anxious (where symptoms of weakness have not already come on) to endeavor to take off the disease by medicines producing symptoms similar to those which take place in the crisis of fever, (such as preparations of antimony, ipecacuanha, &c.) If these do not succeed and no crisis is produced, he must in this case desist from them about the tenth day of the disease; otherwise they will run a risk of occasioning partial evacuations: (which weaken the patient unnecessarily.)—The author does not know a more unpleasant situation than that of the practitioner in this case: since all that he can do is to endeavor to keep up the strength of the patient, by such food as his stomach can digest, and by a very moderate quantity of wine. The patient, his relations, and the by-standers, in the mean time, are constantly urging him to use some powerful remedy; while he knows, that if he complies with their importunity, it will only add to the danger, without affording the least chance of shortening the disease, (excepting by the destruction of the patient.) It is his duty, therefore, to resist every consideration of this kind: and wait patiently until the disease is worn out.

In the second case which has been pointed out, that is, where the fever actually *observes critical days*:—if there should be considerable appearance of crisis on one of these critical days, and the patient be much relieved, and continue better for two or three days, but afterwards grow gradually worse again for two or three days longer;

or if there be a strong exacerbation followed by few or no critical symptoms, and the patient be left during the next relaxation with much severer symptoms of the disease; and if afterwards for a day or two the patient continue extremely ill, and then on a subsequent critical day there be strong appearances of a crisis, and the patient be relieved again for a day or two, and then gradually get worse; or if a much stronger exacerbation follow again, with hardly any symptoms of crisis, and the disease go on: then *either* the recurrence of one such strong exacerbation destroys the patient; *or* the disease runs on until the patient sinks.---This mischief is increased considerably, if the appearance of critical symptoms should take place on a day that is not critical in the disease; (that is to say, if the fever assume the tertian type on the fifth day of the disease, and consequently the seventh, ninth, and eleventh be the critical days.) In a case of this description, if a great relaxation after a strong exacerbation should take place on the sixth, eighth or tenth, &c. day of the disease; and the disease should then gradually get worse again, (as has just been pointed out): or if the tertian type should begin on the sixth day of the disease, so that the critical days (which Hippocrates calls bastard critical days) should be on the eighth, tenth, &c.; and if after a severe exacerbation a greater relaxation should take place on the seventh, ninth, &c. days: the danger increases both of the patient's being carried off by a severe exacerbation; and also of the disease running to a very great length, (so that the patient shall sink under the weakness.)---Where great relaxation takes place in any of these fluctuating cases, the *appearances* are a great degree of cleanness of the tongue, (especially about the edges;) the costiveness going off; the skin becoming moist; a mucous cloud appearing in the urine, interspersed with various particles of flaky, whitish, or lateritious matter; and the patient's sleeping better. These, and other critical symptoms, continue for a day or two; and *then again* the tongue becomes foul, the skin dry, the sleep ceases, the delirium is increased (either gradually or all at once;) and with these, the other symptoms are also augmented to such a degree, that death is often the consequence.---In such cases, it is worth while, immediately after such considerable relaxation of the disease, to employ large quantities of the bark of the cinchona, in substance; (that is, to the quantity of a dram every two or four hours;) to prevent the return of the disease. This practice frequently succeeds:

---But when it does not, it often increases the difficulty of respiration, or the affection of the head; so that the patient dies. It is nevertheless worth running the risk; since the disease, if left to itself, is much more frequently fatal.—This kind of irregularity in continued fever, is fortunately not very frequent; and many practitioners may not have noticed it.

Sometimes, however, fevers of this fluctuating kind are *epidemic* in a very high degree. In the course of two or three months, (about sixteen or twenty years ago) the author saw at least forty such cases in St. Thomas's Hospital. He had remarked this irregularity before that time; and had seen it in most cases fatal, by wearing out the patient. No perfect crisis took place; nor did the disease spontaneously cease in about three weeks, as continued fevers generally do. In this epidemic, the irregularity was such as to weaken and carry off the patient, in most cases, in less than three weeks.—This induced the author to try the exhibition of large quantities of *Peruvian Bark*; and from that time, the author did not lose more than one patient out of seven.—It is necessary to observe, however, that of those patients who died, several were lost from great affection of the head or breast; evidently in consequence of the effects of the cinchona. (This happened not only in the Hospital, but also in many cases, which elsewhere fell under his care.)—It must be observed, on the other hand, that this kind of irregularity in the disease, when the cinchona was not employed, was fatal to more than half the patients in whom it occurred.

It must lastly be mentioned, that this kind of irregularity is *in all degrees*;—and therefore, that when it is in a very slight one, there is room left to consider whether this practice ought to be pursued.

3d. The next irregularity which is to be taken notice of is, when *Hysteric Symptoms* occur during the progress of the disease.—It happens sometimes, that hysteric symptoms take place in men, as well as in women, when they are otherwise in ordinary Health; (though this is very rare): but in *Fevers*, both sexes are nearly equally apt to be affected with them.

These hysteric symptoms are, great irregularity in the appearances of the disease. The pulse sometimes rises to a hundred and fifty or sixty strokes in a minute, (or even more than can be counted:) this happens without any great oppression upon the breast, or any great affection of the head, or in short, without any aggravation of the other symptoms of the disease. The tongue is at the same time tolerably clean, (even cleaner sometimes than it is in its ordinary state;) the skin is moist; and the other functions of the body not much affected. Sometimes there is great depression of the spirits and great anxiety of mind; without any apparent cause. Sometimes the patient falls into violent floods of tears; for which he is unable to assign a reason. Sometimes there is a great flow of almost colorless urine; or it is sometimes of a faint white color, like whey. Now and then subsultus tendinum arises in the wrists; but without much affection of the head.—The hysteric symptoms however are more alarming to the patient, his relations, and even to practitioners of no great experience in the disease; than they are dangerous.—But it must be remarked, that they often prevent the disease from subsiding by its ordinary course; (which sometimes runs on beyond three weeks;) and, in consequence, weakens the patient so as to be fatal.

In case such hysteric affections should make their appearance, the patient ought to be supported by animal broths, from which all *fat* has been carefully separated, (by allowing them to cool, and straining them before they are used;) and by farinaceous vegetable solutions, (such as water gruel, panada, sago, &c.,) mixed with a moderate quantity of wine, not exceeding a pint in twenty four hours. At the same time the patient should take a moderate quantity of opium (about eight or ten drops of the tinctura opii,) with some antispasmodic (such as about ten grains of Russian castor,) every four hours.—He ought also by no means to be irritated by blisters, especially those containing cantharides; (which the author has known in many cases to have been absorbed; and to have irritated the system, so as to produce these symptoms.)—Very great care must also be taken not to irritate the patient's mind, by allowing any thing to be revealed to him, with regard to his affairs; (which is a precaution necessary in all cases of fever, but especially in this.)

4th. The last irregularity to be mentioned, as apt to happen in fever, is, when *Many critical symptoms take place all at once,* either on a true, or (as Hippocrates calls it) on a bastard *critical day.*—These happen generally about four or five o'clock in the morning.—They are, a copious sweat; one or two loose evacuations from the intestines; the tongue becoming clean all over, or at least about the edges; a lateritious sediment falling to the bottom of the urine on standing, &c. If the delirium, nevertheless, do not at all subside, (especially when that delirium has not been attended with symptoms of fulness of the vessels of the brain;) or if, though the delirium has subsided considerably, the pulse remain equally frequent, or become more frequent than it was before; or if the patient be at the same time very restless; or if the oppression about the precordia continue as considerable as it was before, together with difficulty of breathing; or if, notwithstanding the appearance of several critical symptoms, the sleep continue unquiet and unrefreshing; or if the appetite have not at all recurred;—in all these cases, (when they have come under the author's observation,) the disease has always been fatal.

The author has suspected in these cases, that some mischief has happened, during the disease, to some particular part of the body, (such as the brain, the heart, the lungs, or some of the other viscera necessary to life;) and he has in consequence had the body opened by Mr. Hunter, and others of the first anatomists of the age: but yet without finding any apparent injury in any of the vital parts.

It happens sometimes, that in this irregularity, and appearance of several critical symptoms, the *delirium* (which had been very great almost from the beginning of the disease) has all at once subsided, and gone off entirely; the pulse remaining at the same time frequent to perhaps a hundred and ten or twenty strokes in a minute; the depression of strength continuing without any variation; the appetite being lost to a still greater degree; and the whole functions of the body being more deranged.—The patient remains in this state to appearance perfectly in his senses; and then all at once sinks and is carried off; (as if the mind, though conscious of its connection with the material part of the system, had disentangled itself from all attention to it.)

END OF THE FIFTH DISSERTATION.

GENERAL CONCLUSION

TO THE

AUTHOR'S FIVE DISSERTATIONS

ON

FEVER.*

THE very vague manner, in which most authors have defined and described the disease they have called "*Fever*;" leaves it difficult to ascertain what they mean by this term. Such of them, however, as have written after long practice, mean certainly one individual disease.—This induced the author of the preceding Dissertations to try to investigate exactly the disease these authors intended to explain.

He was the more inclined to this undertaking, by finding systematic writers (who had generally seen little or no practice) confound themselves (and, what is worse, their readers) in a labyrinth, from which they had no clue to extricate themselves.—Another motive for this undertaking arose from the confusion to be found in almost every school of medicine; where teachers have almost always endeavored to introduce some plausible hypothesis. If they could infuse into the enthusiastic minds of young men a fondness for their doctrines, it has been sufficient always to render the school famous, and to attract to it numerous students. After the teacher's death, the school has gradually diminished; and a new hypothesis, in some other part of Europe, has then attracted to it a new attention, with the same success. (Witness the Italian schools; those of Montpelier, Paris, and Leyden; not to mention others nearer our own time.)—It is also to be observed, that the success of Linnæus, in establishing, if the author may so call it, a dictionary of plants; (in which he has made use of the different figures of tne parts of fructification, as the first letter of his alphabet;) induced him to make similar attempts, not only in all other parts of natural history; but also in diseases. In this last attempt he has been imitated by many others; who have labored to make the same kind of dictionary of diseases. Such attempts must cease of themselves, perhaps for ever; at least until our knowledge of diseases is advanced far beyond the point at which it is arrived at present.—The fallacy of this mode, and what has been already observed, were the motives which led the author to so arduous a task as that which he has undertaken.

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* This *General Conclusion* was printed and sold along with the last of the preceding Dissertations; to which it was made to serve as a Sequel.

First then, he has endeavored to discriminate exactly that disease, which has been understood by practitioners of much experience, by the name of *Fever*:—Such as was understood by that name by the ancient Greek physicians; (and is described in that compilation of their medical knowledge, which goes by the name of the works of Hippocrates;) such as was afterwards described by Celsus, Galen, Aretæus, and other physicians, who practiced in the Roman Empire about the time of Augustus Cæsar, or in a century or two after it;—and such as was likewise understood by Hoffmann, and some others, after the revival of literature.

1*st*. The author has endeavored to show, in the *First* Dissertation—first, that though fever is a disease of the *whole system*, it does not necessarily occupy the whole of it *at the same time*. It is sometimes not present in particular parts of the body; and there is no symptom that may not be wanting, even during the whole time of the disease. There is none therefore that can be considered as the first letter of an alphabet, (such as the number and position of the stamina in plants;) on which account it is impossible to make any such arrangement in this disease, as has been attempted by Linnæus, Sauvages, and many others. (The disease consequently must be looked at in all its parts, to be comprehended.)---In the second place, he has endeavored to show that fever is a *disease in itself*, not depending on any other disorder in the system; (or, in other words, not a symptomatic, but an idiophatic disease.)---He has endeavored also to enumerate some of the *Causes* producing this disease; and likewise to show, that it often arises from causes which are not at all known: that from whatever cause it arises, when it once takes place, it is totally *independent of the cause* which produced it, (and goes through its farther progress most commonly in the same manner, whether its original cause continues to be applied or not:)---that in itself it is a *short disease*, hardly ever continuing above twenty four hours, and never so long as seventy two hours:---and that it consists of an attack, a natural cure, and the appearances which take place during the time of its going off.

2*d* and 3*d*. In the *Second* and *Third* Dissertations the author has shown, that fever may be continued for a longer time by *Repetition*; (that is, by a new paroxysm taking place after the first has gone off, or during the time that the first is going through its progress.)

In the *first place*, he has shown in the *Second* Dissertation, that one paroxysm may entirely go off, and another, after a certain interval, take place—also that when one paroxysm has taken place and gone through its stages, so as to leave the patient free from every symptom of the disease, (or, in other words, when the crisis is perfectly complete,) it rarely or perhaps never, recurs; that is, the patient is *not more subject to fever*, than a man is who was never before affected with that disease:---But that sometimes, although rarely, some symptom of the disease, (not perceived by the patient or by-standers or even by a practitioner in medicine,) may still remain: in which case the disease *often returns*.

When a crisis more or less complete, but *not* absolutely complete, has taken place in the first or some subsequent paroxysm, in the first week of a fever; the disease recurs: and is called an *Intermitting* or *Remitting* fever.—When a new paroxysm of fever occurs in this manner, it rarely arises from the same causes which *originally* produced the disease; but most commonly from some unknown cause: which is most apt to act at the end of about forty eight hours; and which sometimes also acts (but not so frequently) at the end of about twenty four or seventy two hours; (though there are cases in which it acts at the end of almost any other number of hours.)---Not only each paroxysm has a natural cure, which carries it off more or less perfectly: But the paroxysms at the beginning of the disease grow more and more violent for a certain period of time; then remain nearly in the same degree for another period; and afterwards diminish and entirely subside, (leaving the patient in health, but much weakened by the disease.)---On the other hand, it sometimes happens, that a *perfect crisis terminates one of the paroxysms*; and then the disease does not recur; but leaves the patient in health; only weaker than before the attack of the disease.

The disease may attack the patient in *any one of the paroxysms*, with such violent symptoms of the first stage, as to prove fatal.—In the ordinary progress also of the disease, such a degree of *Weakness* may take place, as that the patient shall sink;---or some of the *Viscera* may be so much hurt, as to produce fatal effects.

The *Treatment* of the disease may be considered in three lights; *first*, the disease may be allowed to go through its course, (taking care only that no mischief shall happen to the patient during its progress:)---*secondly*, such medicines may be used, as shall induce a perfect crisis in one of the paroxysms (so as to prevent the disease recurring,) or at least render the intermission so perfect, as to allow of proper nourishment and exercise (and so prevent the patient from being weakened and exhausted,) until the disease wears itself out:---and *lastly*, medicines may be employed which shall counteract the unknown cause of the recurring of the paroxysms, and prevent the return of the disease.

In the *Third* Dissertation, the author has pointed out those cases, in which a fresh paroxysm occurs *during the continuance of the symptoms of the former*; (or, in other words, during the hot fit of the preceding paroxysm of the disease; which shows that some exertion is made towards carrying off the disease.)---This attack of the fresh paroxysm takes place in consequence of *some cause*, which induces in all men some appearance of fever in the *evening*, in whatever climate they happen to be: (a fact, which although it is evident in all mankind, has had no adequate cause assigned for it.)---In this case a fresh attack of the disease takes place in the evening of the same civil day, if the first attack was before six in the morning of that day:---But if the first attack was after six in the morning of a civil day and before midnight of the same day, (which is almost always the case,) and if the hot fit continue, without producing a crisis, till six o'clock in the subsequent civil day; then the first exacerbation arises between five and six o'clock in the evening of the subsequent day: and the second exacerbation of the disease and the following ones all take place between five and six o'clock of each succeeding day.----This is called a *continued* fever.

There are three methods by which a continued fever may terminate *without the aid of medicine*

First; the *Exacerbations* may gradually become more and more violent *every* day, for a certain length of time, (commonly during the first week of the disease:) and in consequence, the fever will gradually increase: Afterwards, the exacerbations may become more severe every *other* day:---or the disease may continue nearly *equal* for a certain length of time, (generally to the end of the second week or fourteenth day of the disease.) The appearances of the disease itself are therefore nearly equal during this period.---After this, the disease gradually *diminishes* of itself, and entirely leaves the patient; (commonly by the twenty first day after the attack).---The Duration of these periods is however uncertain; so that the period of the *Increase* of the disease may be extended (but rarely) much beyond the first week. The period of its remaining *Stationary* may be increased considerably beyond the second week; and the period of its *Diminution* may be still farther enlarged: so that the disease may be extended to six weeks, or even longer; and be entangled with symptoms of irregularity, &c. (as described in the fifth Dissertation).---This is the first way in which a continued fever may terminate, without any assistance from medicine.

Secondly; an *Inflammation* may take place in some part of the body, (sometimes in one part and sometimes in another,) without any apparent cause; and may terminate the fever itself; so that sometimes the patient shall recover his health immediately; (excepting for the symptoms of the inflammation, or the affection of the system arising in consequence of it).---The same thing may happen from an *Active Hemorrhage* taking place.---In this second mode also, the patient may be entirely freed from the fever, without any assistance from medicine.

A *third* method in which a fever is often terminated without the aid of medicine, is, by a *Crisis* putting an end to one paroxysm completely; so as entirely to liberate the patient from the disease.---In this third way, the crisis takes place, in the first week, on the days of the quotidian type; in the second week, on the days of the tertian type; and in the third week, on the days of the quartan type. —Farther; when such a crisis takes place in the First Week, the disease is apt to recur: but if such a crisis should take place in the second week, the disease is less apt to recur; and if it takes place in the third week, the fever rarely recurs.---Generally, the more perfect is the crisis, the less probable is the return.

Thus then, there are three ways in which a fever may be terminated, and the patient restored to health, without assistance from medicine: (nay, even though a practitioner had used every means that was likely to destroy the patient, or prevent the fever from going off by the powers inherent in the body).---A practitioner therefore, is not to believe that the remedies he has employed cure the patient, if he gets well; unless he understands how the disease would have proceeded, had no medicine been employed.

It has been also stated in the third Dissertation, that a continued fever may be *terminated by the Exhibition of Medicines*, which produce appearances in the body similar to those taking place in the crisis of fever. (The principal medicines which produce this effect, are preparations of antimony, ipecacuanha, and cold water drunk in large quantity.)---These medicines tend to produce *Relaxation* in all parts of the body; and have their principal and most powerful effects, when employed at the beginning of the disease. They certainly produce crisis in fever much more frequently, than it would have arisen if they had not been exhibited: but still, it is necessary, if they do not produce such crisis, that a practitioner should attend to the ordinary progress of the disease.—In the next place, the disease sometimes may be carried off *by producing a Hemorrhage* or *an Inflammation*, in some part of the body. The only cases in which occasioning a hemorrhage has been known to succeed, are those in which it has been produced by opening some vessel of the head; (when the head has been particularly affected at the beginning of the disease.) Inflammation also has been excited in the external parts of the body; in consequence of which the disease has sometimes been carried off, or at least diminished.

All these methods, although they may not carry off the fever entirely; yet in many cases diminish the symptoms considerably: so that the disease goes through its ordinary progress; and the patient recovers, when otherwise he would have been destroyed.

When such medicines however are exhibited as produce the ordinary symptoms of crisis; they sometimes act partially; and increase some single evacuation, so as to render the patient weak and unable to sustain the ordinary progress of the disease. If this should happen, they are to be abandoned.—The producing of hemorrhage from the head, (if that be the part chiefly affected,) also occasions weakness; and is therefore improper, if the evacuation be considerable.---Exciting an inflammation by cantharides or otherwise, in any exterior part of the body, is apt to irritate the patient; and render the disease more hazardous: and should not, therefore, be practised, except some part of the body be considerably affected. (In this opinion however the author differs from many practitioners; some of them being among the most judicious; while others of them are tempted to employ this remedy by the desire of impressing on the minds of the relations of the sick and the by-standers, that they are not inattentive to the means of curing the disease.)

The author has also said in the third Dissertation, that many have employed the *Bark of the cinchona* to prevent the recurring of the exacerbations in *Continued* fevers:---but he has also mentioned, that it seldom has this effect; and that where it fails, it increases the affection of the head and breast, so as to endanger the life of the patient.

The author has likewise taken notice of an opinion, which has been adopted by many practitioners; to wit, that no effort should be made to check the ordinary course of the disease, but that it ought to be suffered to go through its progress; (which they call, leaving it entirely to nature.)---Supposing that no medicine has been found out that would carry off a fever; it would still not be indifferent what attention is paid to the patient. It is also clear, that when those medicines which have been found to carry off fever in a number of cases, have failed; it is even then not indifferent in what manner a patient has been treated.---The author, therefore, has shown in the Third Dissertation, that in all fevers it is necessary to clear the primæ viæ of any noxious matter that may be contained in them; that the patient should have such nourishment, as shall not disorder either the primæ viæ or any part of the system; that the mind should be kept perfectly at rest; that the patient should remain in bed, in a moderate degree of heat, and in an air free from noxious matter; and that evacuations which are not critical, ought to be checked, when in too great a quantity.

It was next to be inquired in what manner a fever may be *Fatal to the patient*.---In the first place, the disease may be fatal from its own violence; secondly, from some particular part of the body being much more affected than the other parts of the system; in the third place, from the patient's being weakened and worn out by the disease; and lastly, by some *Accident*, which may destroy the patient, (and which either might have been fatal, had it happened in a person not afflicted with fever; or yet proves fatal in consequence of the state of the system during such disease.)

The notice of the method of obviating these dangers properly belonged to the fourth and fifth Dissertations: but as the means of *diminishing* the fever, are the same as those which often entirely carry it off; this subject was in fact discussed in the second and third Dissertations.

One of the *Accidents* which are apt to arise in the disease, and sometimes to destroy the patient; is a degree of *putrefaction* which takes place in the fluids.---It has been shown in the third Dissertation, that this disposition to putrefaction depends entirely on the depression of strength; and that, therefore, no *antiputrescent* is of any use in preventing or carrying it off; but that taking care not to make unnecessary evacuations at the beginning of the disease, employing such food as can be perfectly digested without difficulty, and endeavoring by other means to avoid wasting the powers of the system; are the only measures which can be employed; (excepting where hemorrhage takes place; and that in this case, the bark of the cinchona is to be exhibited, together with acids, of which the vitriolic and muriatic seem to be the most powerful.)

4th and *5th*.---The *other Dangers*, to which patients in fever are exposed, have been treated of in the Fourth and Fifth Dissertations.

It has been shown in these, that *General Inflammation* is sometimes fatal by such a quantity of blood being thrown upon the brain, as to produce delirium and destroy the patient;---or by such a degree of tension taking place in every part of the system, that if by any accident the strong action of the heart and arteries ceases (even for a very short period of time,) the tension likewise ceases, and the patient is carried off;---or by an inflammation occurring in some particular part of the body, without entirely carrying off the fever;---(so that the patient shall labor under *two diseases*; namely, the inflammation with its effects on the system, and the fever.)

It has been shown in the *Fourth* Dissertation, that this general inflammation often renders the intermissions of an intermitting fever imperfect; so as to cause the paroxysms to run into each other, and even to resemble a continued fever, in the first week of the disease: that in this case, a quantity of *blood may be taken* away to remove the general inflammation; (since, if the intermissions become more perfect, time will be afforded to employ nourishment to replenish the vessels:) that this general inflammation very rarely happens in warm climates: and that weakness in those climates being much more dangerous, evacuation by bleeding should hardly ever be made in the fevers which occur in them.

In the *Fifth* Dissertation it has been shown, if the fever cannot be carried off, but goes necessarily through its ordinary course; that then, although no mischief appears immediately from taking away a large quantity of blood; yet, as no time is afforded for food to be digested, the vessels cannot be replenished: and such a degree of *weakness* is produced in the third week in consequence of the bleeding, as to carry off the patient.—Another mischief also happens, which is, that the weakness produced by the bleeding, together with the depression of strength; often produces *putrefaction* of the fluids in the second week of the disease, to a degree that is fatal.---It is, therefore, very necessary to avoid taking away blood at the beginning of continued fevers; except there be such a degree of inflammation present, as threatens the life of the patient.

In the *Fourth* Dissertation, it has been shown, that in *intermitting and remitting* fevers in *hot* climates, (in which they occur by far the most commonly) the paroxysms are peculiarly violent: so that when a few of them have taken place, the disease is often fatal. In this case, practitioners have been frightened; (as spectators are, when violent torrents are carrying every thing along with them:) and losing their presence of mind, some have employed copious evacuations by bleeding; some, active purgatives; some, emetics; others, mercury in large doses so as to produce salivation; and some of them have thrown large quantities of cold water upon their patients. But all these measures have proved equally unsuccessful; as appears, when fevers have arisen in armies, by the returns made of those who have died.---The practice therefore recommended in the second Dissertation, should alone be attended to in remittents in such climates.

In the *Fifth* Dissertation, the author has shown, that sometimes the brain, the lungs, or the heart, (or at least some part about the head or breast,) have been so hurt, that although a crisis has taken place so as to carry off the fever itself; the patient has nevertheless died.

In the same Dissertation the author has also shown the mischiefs which arise from the several parts of the system *not being Equally Affected* with the disease; and the modes that may be employed to remedy this.

He has likewise taken notice of the *Hysteric* symptoms which often occur in irregular fevers; (and has said that they may be relieved by small doses of opium and antispasmodics).

The author, (having thus briefly recapitulated the principal subjects of his several Dissertations, and taking example from Columella, who published his works upon agriculture at different times,) wishes now to notice the *Criticisms*, which as he has heard, have been made upon him.

First: It has been said by some, that he has been *too minute* in describing the disease itself, and the remedies to be employed in it; or (as these observers have expressed it) he has been too verbose in these Dissertations. But he begs leave to remark, that most authors and teachers of medicine at this time are scandalously negligent in giving accounts of diseases, and the remedies that are to be employed in them; so much so, that there are teachers in London, who pretend to teach the whole knowledge of all the diseases incident to the human body, as well as the effects of the remedies applicable to them, in thirty six lectures of somewhat less than an hour each.---If a man were but to reflect on the great importance of this science to mankind, and on the immense detriment it is to a family, to lose either a father or a mother at a premature age; not to mention the distress arising from parents losing their children; he would take great care, before he began to practice this art, to inquire into it in the most minute manner.---The author has found, in correcting the copy of the second edition of the first Dissertation, that (without adding any one new idea) he has been obliged to extend it considerably in words.

Secondly: With regard to *plagiarism*, he will take for instance, (what he has been said to borrow from Dr. Cullen,) his remarks on the use and mode of action of antimony.---He certainly cannot justly be said to take the *use* of antimony in fevers from Dr. Cullen; because it is well known, that Dr. James, (a regular bred physician) had brought it into general use, before Dr. Cullen began to teach medicine.---Neither can he be said to have taken the *mode of its action* from Dr. Cullen; because Dr. Cullen called it a nauseating medicine; and ascribed its effects, in carrying off fever, to its producing sickness: and this he taught to the author; (who embraces this opportunity of acknowledging the acquirement of much knowledge from so great a master in medicine; and also his great friendship in admitting him at all times like a son into his house.) The author, on the other hand, when he came to see a great number of patients, after being chosen physician to St. Thomas's Hospital; found (as he has observed in these Dissertations,) that, so far from the sickness produced by antimony being the cause which carries off fever, even small doses made the effect much less certain, where they produced sickness; and also that other medicines, which occasion as great sickness as is induced by antimony, (such as squills,) have not the least power of producing symptoms similar to those which take place in the crisis of fever.

Lastly: The author has to remark; that he has not made *the species of fever* such, as have commonly been made by almost all authors from the beginning of medicine.---In the first place, the author has excluded from fever, all diseases in which the pulse becomes more frequent, the tongue foul, and the system is otherwise deranged, if this derangement evidently arises from some manifest cause; (such as inflammation, suppuration, extraneous substances lodged in some particular parts of the body, and various other similar circumstances; which during their action keep up the above mentioned appearances in the system; and when they cease, permit the body to return gradually to its healthy state.)---He has said, also, that the action of causes of fever produces the disease at once; and that the fever continues, whether the cause be present or be removed: (and he has by this means cut off a great many diseases, which by many practitioners have been called fevers.)

He has in short, admitted only *two distinct species of fever;* to wit, *Continued fevers, and Intermitting or Remitting* fevers.---These he has distinguished, in the *first* place, by the *causes of the returns of the paroxysms.* This cause in continued fevers is the *evening paroxysm* of fever, (which occurs to all men, whether in health or in disease;) between five and six o'clock in the evening. The cause of the returns of the paroxysms of intermittent fevers is *certain periods of time*, (which are nearly about the end of forty eight, twenty four, or seventy two hours: excepting that there is an indisposition to the returns from ten o'clock in the evening to six in the morning:) and these periods of time have been called *Types*.---There is also *another* essential difference between these two species of fever. The attacks in intermittents are much more severe; and the intermissions or remissions much more perfect than in continued fevers.---And farther: *Continued* fevers, (if no accident occurs,) go through their course, so as to terminate before the end of the third week; while *Intermittents* generally run on for a longer time; but *Remittents*, (especially in warm climates,) are often fatal even in the first week of the disease.

Many distinctions have been made in *Continued* fevers, by various authors in all ages of medicine, taken from some symptom arising in their course. Fevers were reduced by Sydenham (who wrote only from his experience) into *three species*, which he called epidemics.---This distinction has since his time been very generally followed;---but the names given them are different. They have been called by some inflammatory; pestilential or malignant; and nervous: By others they have been called inflammatory; putrid [or] jail; and nervous fevers: By others, synocha, typhus, and synochus, (using Greek terms, in which the present age abounds; as if changing the language or name was by some magic to produce a new real difference.)---The author, (led by the authority of Sydenham, and by many other modern practitioners of great experience,) when he first began to teach medicine in the year 1766, himself divided *Continued* fevers into three species;---But he has since found by long experience, that these apparent species merely proceed from the accidents of general inflammation, disposition to putrefaction, destruction of some of the vital parts of the body, irregularity, hysteric symptoms, or weakness, occurring in the disease; (but which by no means constitute any specific difference.)—Men will have some specific name for the fever with which a patient is afflicted; (as when there is bile thrown up, they call it bilious fever; when there is delirium, brain fever:) But these names surely constitute no useful distinction either for understanding or curing the disease.

FINIS.

NOTE; referred to in the note at page 408.

Formerly, *Arsenic* was in general only employed externally, or to act against vermin, or for criminal purposes. Empirics however have long used it clandestinely for *internal* objects; but whether they learned its benefits from accident, the alchemists, or the oriental world, seems unknown. The relief however yielded by arsenic in various periodical complaints, and in some cutaneous diseases; to say nothing of many other uses ascribed to it; has finally procured for it a place in several public pharmacopœias, particularly as combined with potass. A preparation of arsenic however had long been in repute in certain parts of England, in the form of a drop; and Senac (in his excellent work on Intermittents) allows, that many intermittents have been cured by Arsenic.

No place in temperate climates has perhaps been more noted for producing inveterate intermittents, than the island of *Walcheren*, at the mouth of the Scheld; and yet for certain cases of the Walcheren fever the experienced Sir Gilbert Blane found no remedy so useful, as *Arsenic joined to Opium.* Where the stomach was irritable, he gave for *purgatives*, calomel joined either to neutral salts, or else to carbonated magnesia in effervescence with lemon juice. If the periodical paroxysms were also imperfect, he administered from 30 to 50 drops of *tincture of opium*, in the intermission, a few hours before a return was expected; adding rhubarb to the opiate, to prevent costiveness.—If bark could not be borne, he then substituted from 6 to 12 drops of the *liquor arsenicalis* of the London Pharmacopœia, 3 times daily in the intermissions; till relapse was no longer to be dreaded. He much preferred arsenic combined with opium, to zinc; (with the use of which he nevertheless was familiar:) strengthening the stomach, if needed, with bitters and aromatics. (See Vol. 3 of the Transactions of the London Medical and Chirurgical Society.)

The uncertainty of the dose of arsenic in a solid form, may be obviated by giving it in a liquid shape. It is proper however in every case to employ a moderate dose; for a dose consisting only of a single drop has in one instance cured a periodical head-ache. By the use of caution, we shall perhaps no longer hear (as from Senac and Dr. Duncan, jr.) that arsenic has been suspected of introducing *phthisis.*

An Experimental Treatise on the *uses* of arsenic, is much wanted; especially in a country, like the U. States, so extensively subject to intermittents, &c.

A few hints also on this occasion as to *Theory*, will doubtless be acceptable; for as yet we know little on this part of the subject. One of the most certain effects of arsenic in the human system, where it falls short of being corrosive, is that of exciting inflammation on the surface of the stomach. Orfila (in his Elemens de Chimie Medicale, 1817) says also, that the breathing of arseniated Hydrogen seemed to be fatal in the case of Professor Goblen of Munich, by its action on the *nerves*. The efficacy of the liquor arsenicalis, or of the white oxyd of arsenic, (especially when aided by purgatives) against the bite of different kinds of *Serpents*, in the East or West-Indies, may be seen in a paper in the 2d Vol. of the Transactions of the London Medical and Chirurgical Society. For *tests* also as to arsenic, see the same work.

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[N. B. The above advertisement might have included the following *additional* particulars.

Several Papers on Philosophical subjects in which the author was concerned, will be found in the Transactions of the Royal Society of London.

The author also refers to an Inaugural Dissertation on *Mucus*, or rather on *Catarrh;* and this is preserved in the *Thesaurus Medicus* of Dr. Smellie; (this thesaurus being a selection from the Inaugural Dissertations, delivered by Medical Students graduating at Edinburgh.) Vol. II. 505.]